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ABSTRACT

Described is a research and demonstration program for elementary school children with specific learning disabilities (LD), involving diagnostic services for 1,238 Ss and individually prescribed remediation for 990 Ss over a 3-year period. Eight chapters cover the following: organization, administration, and delivery of services; a comparison of the efficacy of resource and itinerant programs; a hierarchical grouping approach to the characteristics of the Ss; a developmental first grade program; the social behaviors of LD children; three selected case studies; remediation; and a summary of the findings. It is noted that the program is based on a diagnostic-remedial model involving the regular classroom teachers. Among conclusions reported are that LD Ss in the itinerant program appeared to do better than resource room children, that Ward's hierarchical grouping technique appeared to be a suitable technique for handling data on handicapped children, and that subgroups of LD children were described using this method. (Author/IM)

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# A PUBLIC SCHOOL PROGRAM OF REMEDIATION FOR CHILDREN WITH SPECIFIC LEARNING DISABILITIES

Jeanne McRae McCarthy

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EC092213

A PUBLIC SCHOOL PROGRAM OF REMEDIATION

FOR CHILDREN WITH SPECIFIC LEARNING DISABILITIES

## APPENDIX D--ERIC REPORT RESUME

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800 A research and demonstration program for children with specific
801 learning disabilities is described in eight chapters: Organ-
802 ization, administration and delivery of services, a comparison
803 of the efficacy of resource and itinerant programs, a hierarch-
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805 a developmental first grade program, the social behaviors of
806 learning disabled children, selected case studies, remediation
807 and a summary of the findings. The program described is based
808 on a diagnostic-remedial model involving the regular class-
809 room teachers. LD children in the itinerant program appeared
810 to do better than match resource room children. Ward's hier-
811 archical grouping technique appears to be a suitable technique
812 for handling data on handicapped children. Using this method
813 subgroups of LD children have been described. Pre and post
814 data is avilable on the psychometric characteristics of
815 children not ready for first grade. The Q-BAT and the Behavior
816 Problem checklist were used to delineate patterns of behavior
817 in LD children. These were compared with emotionally dis-
818 turbed and normal children. The remedial techniques used in
819 the project are described, some general principles of remedia-
820 tion are detailed, and three case studies are presented.
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Final Report

Project No. 6-2003
Grant No. OEG-3-6-062003-1583

# A PUBLIC SCHOOL PROGRAM OF REMEDIATION FOR CHILDREN WITH SPECIFIC LEARNING DISABILITIES

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October 1973

The research reported herein was performed pursuant to a grant with the Bureau of Education for the Handicapped, U.S. Office of Education, Department of Health, Education and Welfare. Contractors undertaking such projects under government sponsorship are encouraged to express freely their professional judgement in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official position of the Bureau of Education for the Handicapped.

Department of Health, Education, and Welfare

U.S. Office of Education
Bureau of Education for the Handicapped

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The success or failure of a project such as this is due to a myriad of known and unknown factors. It is very difficult for the author to acknowledge adequately all those human factors that contributed to the inception of the idea, the implementation of all the facets of the project, and the completion of each component.

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It would not have been possible to have considered such a project if the administrative and community support had not been present. The Board of Education under the presidency of Eleanor Thorsen, demonstrated vision and foresight in their concern for the individual learners in District 54. The enthusiastic support of Kenneth Underwood, Superintendent at the inception of the project, was supplemented by the enthusiastic support and concern of Wayne Schaible who became Superintendent at the end of the first year of operation. Mr. Schaible provided the kind of support that permitted the project to continue to flourish after federal funding was discontinued. Without his constant involvement, this may have been just another project which came and went with federal monies, with little lasting impact on programs for children.

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Once we were able to write the proposal, initiate the program, follow through with all phases of the project, the job of collating and interpreting the data assumed paramount importance. At this point John Paraskevopolous became involved and spent many hours analyzing data and working out interpretations and implications which were consistent with reality. When he returned to Greece his able co-worker Ira Langston, Jr. continued to lend his knowledge, especially in the difficult statistical procedures involved in Chapter 4.

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TABLE OF CONTENTS


| | | Page |
|---|---|---|
| Acknowledgements | | i |
| Chapter | | |
| I. | Introduction | 1 |
| | Objectives of the Study | 1 |
| | Background of the Problem | 2 |
| | Issues in the Field | 3 |
| | Prevalence | 3 |
| | Trainability of Psycholinguistic Functions | 4 |
| | Emphasis on Etiology | 4 |
| | Public School Involvement in Diagnosis | 5 |
| | Description of the Study | 6 |
| | The Report | 7 |
| II. | Description of the Project | 9 |
| | Locus: Schaumburg School District 54 | 9 |
| | Selection Criteria | 12 |
| | Services Provided | 14 |
| III. | A Comparison of the Resource and Itinerant Programs | 20 |
| | Similarities and Differences in the Resource and Itinerant Programs | 20 |
| | Method | 22 |
| | Procedure | 25 |
| | Statistical Analysis | 25 |
| | Results | 29 |
| | 1. Psycholinguistic Abilities | 29 |
| | 2. Visual Perception | 32 |
| | 3. Visual-Motor Integration | 32 |
| | 4. Iowa Tests of Basic Skills | 39 |
| | Discussion | 44 |
| | Conclusion | 45 |
| IV. | Characteristics of the Population | 46 |
| | Summary | 52 |
| V. | Psychoeducational Characteristics of Children in Developmental First Grade Classes | 54 |
| | Introduction | 54 |
| | Objectives | 56 |
| | Selection Criteria | 56 |
| | Subjects | 58 |
| | Instrumentation and Evaluation | 58 |
| | Treatment Plan | 59 |
| | Results | 60 |
| | 1. General Intellectual Functioning | 60 |
| | 2. Psycholinguistic Abilities | 65 |

TABLE OF CONTENTS (cont.)


| | | Page |
|---|---|---|
| | 3. Visual Perception | 70 |
| | 4. Visual Motor Integration | 74 |
| | 5. Auditory Discrimination | 74 |
| | Discussion | 78 |
| | Summary | 80 |
| | Kindergarten Screening and Identification Procedures | 80 |
| | Patterns of Cognitive, Psycholinguistic, and Perceptual Development | 80 |
| | The Efficacy of the Developmental First Grade in Remediation of Deficits | 81 |
| VI. | Behavior Patterns | 83 |
| | Subjects | 84 |
| | Instrumentation | 84 |
| | Statistical Treatment | 84 |
| | Factor Analysis of Q-Sort Behavior | 85 |
| | Correlations Among Factor Scores | 89 |
| | Factor Analysis of Behavior Problem Checklist | 92 |
| | A Comparison of the Behavior of Normal, Emotionally Disturbed, and Learning Disabled Children | 97 |
| | Subjects | 98 |
| | Procedure | 98 |
| | Statistical Analysis | 98 |
| | Results | 98 |
| | Summary | 102 |
| | Effects of Remediation upon the Behavior Patterns | 102 |
| | Summary | 108 |
| | Discussion | 108 |
| | Summary | 111 |
| | Organization of the Study | 112 |
| | Results | 113 |
| | 1. Factor Analysis of Q-Sort Behavior Analysis Test | 113 |
| | 2. Factor Analysis of Behavior Problem Checkiist | 114 |
| | 3. A Comparison of the Behaviors of Normal, Emotionally Disturbed, and Learning Disabled Children | 114 |
| | 4. Effects of Remediation on the Behavior Patterns | 114 |
| | Implications of Findings for Service Programs | 115 |
| VII. | Case Studies | 118 |
| | Mark | 120 |
| | Robert | 130 |
| | Clyde | 137 |

TABLE OF CONTENTS (cont.)


| | | Page |
|---|---|---|
| VIII. | Remediation | 150 |
| | General Principles of Remediation | 150 |
| | Specific Areas of Competency in the Teacher | 152 |
| | Sensory-Motor Processing | 152 |
| | Visual Processing | 156 |
| | Auditory Processing | 159 |
| | Language Development | 162 |
| | Intersensory Integration | 164 |
| | Social Adjustment and Emotional Development | 166 |
| | Academics | 168 |
| | Reading | 169 |
| | Arithmetic and Mathematics | 180 |
| IX. | Summary | 182 |
| | Overview of the Study | 182 |
| | The Administrative, Referral and Selection System for Learning Disabled Children | 183 |
| | A Comparison of Resource Room and Itinerant Programs | 183 |
| | The Psychological and Psycholinguistic Characteristics of Sub-Groups of Children with Specific Learning Disabilities | 184 |
| | The Developmental First Grade | 185 |
| | Social Behaviors of Children with Specific Learning Disabilities | 187 |
| | The Program of Remediation | 188 |
| | Bibliography | 190 |

LIST OF TABLES


| Chapter | | Page |
|---|---|---|
| II. | Table 1. Diagnostic Services Rendered to Children | 17 |
| | Table 2. Remediation Services Rendered to Children | 18 |
| III. | Table 3. Schedule for Modified Resource Room | 23 |
| | Table 4. Schedule for Primary Resource Room | 24 |
| | Table 5. Means and Standard Deviations of Matching Variables for Resource Room and Itinerant Programs | 26 |
| | Table 6. Summary of Medical Data on Resource Room Subjects with Neurological Involvement | 27 |
| | Table 7. Summary of Medical Data on Itinerant Subjects with Neurological Involvement | 28 |
| | Table 8. Means and Standard Deviations of ITPA Scores for Resource Room and Itinerant Matched Groups | 30 |
| | Table 9. t-Tests for Mean Differences between Pretreatment and Posttreatment Data on ITPA for Resource Room and Itinerant Matched Groups | 33 |
| | Table 10. Means and Standard Deviations of Frostig Test of Visual Perception Test Scores for Resource and Itinerant Matched Groups | 34 |
| | Table 11. t-Test for Mean Differences between Pretreatment Data on Frostig Test of Visual Perception for Resource Room and Itinerant Matched Groups | 35 |

LIST OF TABLES (cont.)


| Chapter | | Page |
|---|---|---|
| | Table 12.... Means and Standard Deviations of Age-Scores on the Visual Motor Integration Test for Resource and Itinerant Matched Groups | 37 |
| | Table 13.... t-Tests for mean Differences between Pretreatment and Posttreatment Data on the Visual Motor Integration Test | 38 |
| | Table 14.... Means and Standard Deviations of Grade Placement Scores on the Iowa Test of Basic Skills for the Resource and Itinerant Matched Groups | 41 |
| | Table 15.... t-Tests for Mean Differences between Pretreatment and Posttreatment Grade Placement Scores on the Iowa Tests of Basic Skills for the Resource Room and Itinerant Matched Groups | 42 |
| V. | Table 16.... Means and Standard Deviations of WPPSI Scaled Scores, Verbal IQ, Performance IQ and Full Scale IQ | 61 |
| | Table 17.... Intercorrelations for ITPA, Frostig, WPPSI, Developmental Form Sequence and Wepman Auditory Discrimination Scores for 59 Developmental First Grade Children | 62 |
| | Table 18.... Analysis of Variance for the Scaled Scores of the Ten WPPSI Subtests for 59 Developmental First Grade Children | 64 |
| | Table 19.... Means, Standard Deviations of ITPA Language Ages of Pre- and Posttreatment and Gain Scores for 59 Developmental First Grade Children | 66 |
| | Table 20.... Analysis of Variance of ITPA Language Age Scores of the Nine Subtests for 59 Developmental First Grade Children | 68 |

LIST OF TABLES(cont.)


| Chapter | | Page |
|---|---|---|
| | Table 21. Psycholinguistic Quotients, Perceptual Quotients and Visual Motor-Integration Quotients for 59 Developmental First Grade Children | 69 |
| | Table 22. Means and Standard Deviations of Frostig Age Equivalents of Pre and Posttreatment for 59 Developmental First Grade Children | 71 |
| | Table 23. Analysis of Variance for Mean Differences among the Five Frostig Subtests for 59 Developmental First Grade Children | 73 |
| | Table 24. Means, Standard Deviations and the t Value for Pretreatment and Posttreatment Ages on 59 Developmental First Grade Children on the Visual Motor Integration Test | 75 |
| | Table 25. Pretreatment and Posttreatment Performance of 59 Developmental First Grade Children on Wepman's Auditory Discrimination Test | 76 |
| | Table 26. Changes of Performance on Wepman's Auditory Discrimination Test from Pretreatment to Posttreatment for Developmental First Grade Children | 77 |
| VI. | Table 27. Items with High Loadings on Each of the Four Factors Extracted from the Q-Sort Behavior Analysis Test Data on Learning Disabled Children | 86 |
| | Table 28. Means and Standard Deviations and Intercorrelations for Factor Scores Extracted from the Q BAT for Teacher's and Mother's - Ratings of the Child's Observed Behavior | 87 |
| | Table 29. t Values for Mean Differences Among Pre- and Posttreatment Factor Scores for Teachers and Mothers on Q-Sort Behavior Analysis Test Data on Learning Disabled Children | 90 |

LIST OF TABLES (cont.)


Page

Chapter

Table 30..... 91
t-Values for Mean Differences Between Mother's and Teacher's Ratings on Four Factors on Q-Sort Behavior Analysis Test with Learning Disabled Children

Table 31..... 93
Items with High loadings on Each of the Four Factors Extracted from the Behavior Problems Checklist Data on Learning Disabled Children

Table 32..... 95
Coefficients of Factor Similarity of Behavior Problem Checklist Ratings for Learning Disabled and Emotionally Disturbed Children

Table 33..... 96
Intercorrelations for Factor Scores Extracted from the Behavior Problem Checklist for Teachers and Mothers

Table 34..... 99
Means, Standard Deviations and Intercorrelations of Factor Scores for Emotionally Disturbed, Learning Disabled and Average Children

Table 35..... 101
Summary of Analysis of Variance of Factor Scores for Emotionally Disturbed, Learning Disabled and Average Children

Table 36..... 103
Summaries of Analysis of Variance of Factor Scores for Emotionally Disturbed, Learning Disabled and Average Children

Table 37..... 104
S-Values for Multiple Comparisons Among the Factors for Emotionally Disturbed, Learning Disabled and Average Children

Table 38..... 106
t-Values for Mean Differences Between Factor Scores and Pre and Posttreatment for both Teachers and Mothers on the Behavior Problem Checklist

LIST OF TABLES (cont.)


| Chapter | | Page |
|---|---|---|
| | Table 39..... t-Values for Mean Differences Between Factor Scores on the Q-Sort Behavior Analysis Test for Pre- and Posttreatment for Teachers and Mothers | 107 |
| VII. | Table 40..... Mark | 123 |
| | Table 41..... Robert | 126 |
| | Table 42..... Clyde | 148 |

LIST OF FIGURES


| Chapter | | Page |
|---|---|---|
| III. | Figure 1. Language Age: ITPA Tests | 31 |
| | Figure 2. Perceptual Age: Frostig Tests | 36 |
| | Figure 3. VMI Age Scores | 40 |
| | Figure 4. Grade Scores: Iowa Tests of Basic Skills | 43 |
| IV. | Figure 5. Standard and Composite Scores | 49 |
| | Figure 6. ITPA | 51 |
| V. | Figure 7. WPPSI Subtests | 63 |
| | Figure 8. ITPA Tests | 67 |
| | Figure 9. Frostig Tests | 72 |
| VI. | Figure 10. Factor Scores | 88 |
| | Figure 11. Factor Scores | 100 |
| VIII. | Figure 12. Information Processing Model | 153 |
| | Figure 13. Sensory-Motor Processes/Functions | 155 |
| | Figure 14. Visual Processing | 157 |

LIST OF FIGURES (cont.)


Page

Chapter

Figure 15..... 160
Auditory Processing

Figure 16..... 163
Language Development

Figure 17..... 170
Reading Process

Figure 18..... 171
Reading Skills

Figure 19..... 172
Phonetic Analysis

Figure 20..... 173
Structural Analysis

Figure 20..... 174
Structural Analysis (cont.)

Figure 21..... 175
Context Clues

Figure 22..... 176
Comprehension

Figure 22..... 177
Comprehension (cont.)

Figure 22..... 178
Comprehension (cont.)

Figure 22..... 179
Comprehension (cont.)

# CHAPTER I

## Introduction

This is a report of a research and demonstration project for children with learning disabilities in a small public school system, Schaumburg School District 54, Hoffman Estates, Illinois. The project began in September, 1966, and continued for two full years, following a pilot study during the 1965-66 school year. This report presents the data collected during the pilot year, and the two years of the research-demonstration project.

### Objectives of the Study

The major objective of the project has been to demonstrate methods whereby a small public school district can mobilize existing resources to implement a sound program for teaching children with specific learning disabilities.

The specific objectives to be achieved by the program were three:

1. To demonstrate that service to children with specific learning disabilities could be made effective by the use of a combined diagnostic-remedial-consultative approach.

2. To demonstrate that a sound program of remediation could be carried out within the classroom by the regular classroom teacher if she is provided with materials broken into specific units and if she is given the support of a strong consultative service.

3. To demonstrate that more children with specific learning disabilities could be served by such a team approach than by the procedure of placement in a special class, or of referral to outside agencies.

It was anticipated that the proposed procedures would demonstrate that symptomatic treatment of specific learning disabilities could be carried out adequately within the framework of a small public school district by integrating the services frequently found in such school districts into a program of remediation based upon intensive multidisciplinary diagnosis of the disability.

Background of the Problem

The need for a controlled study of public school programming for children who "exhibit a disorder in one or more of the basic psychological processes involved in understanding or in using spoken or written language" was apparent in the early 1960's to special educators, even before the magnitude of the problems involved became as apparent as it is today.

Seldom has a concept burst upon the educational scene with such cataclysmic force as has the concept of specific learning disabilities. Educators have always been aware of the child who did not learn. However, the impetus to academic achievement heralded by the "Sputnik" era had not been felt before by the schools. The societal structure had always been simple enough that the child who did not learn to read was able to become a contributing member of society in some meaningful way that circumvented his inability to read. In addition, the pre-Piaget, pre-Guilford, pre-Bruner interpretation of intelligence indicated that intelligence was hereditary, constant, and essentially unmodifiable. It was against this background that educators became involved in several decades of viewing learning problems as psychogenic manifestations of inner conflict in the child, or as due to poor motivation. Thus, the "child who cannot learn" was seen as the "child who would not learn," because non-learning served a conscious or unconscious role in his struggle with forces which impede ego development. During this era of an essentially psychodynamic conception of learning problems, educators found themselves encouraging parents to involve the child in extensive periods of psychotherapy, in an effort to resolve the inner conflicts which were causing or contributing to the inability to learn. Child development specialists emphasized the need of the child for success experiences, praise, and a relaxed, pleasant approach to school learning tasks. After several decades of often fruitless efforts at manipulating the child's attitude toward learning, it became apparent to many psychiatrists, psychologists, and social workers that tender loving care, or a deeper understanding of his own motivation could at best produce a child who was comfortable, albeit euphoric, with his nonlearning. Pioneer research at this point was begun in a variety of facilities, among them Hawthorne Center, by Ralph Rabinovitch, M.D., who found that the greatest number of emotionally disturbed children who recovered were among those who were being tutored as part of the therapy (Rabinovitch, 1959).

During the waning days of the psychodynamic approach to non-learning, other threads of research and practice began to make an impact on the educational scene, i.e., the work of Alfred Strauss, Laura Lehtinen, and Newell Kephart, with brain-damaged children, and the work of Samuel A. Kirk in reading disabilities and with psycholinguistic

development. The concept of brain damage as a cause of non-learning was apparently a welcome change from the more nebulous, more abstract concepts derived from Freudian psychoanalysis. However, the "brain damaged" era began slowly, with the publishing of Strauss and Lehtinen's book (1947), and did not emerge fullblown until the early 1960's as a many-labeled concept embodying elements derived from a variegated heritage. As a body of theory and research has developed over the past decade, spurred by Kirk and his thinking, involving the child who does not learn, it seems apparent that strands from many disciplines are coalescing in the emergence of Specific Learning Disabilities as a significant educational concept.

Issues in the Field

As educators in the early 1960's began to come to grips with the educational ramifications of the problem, four issues began to be delineated involving: 1) prevalence; 2) trainability of psycholinguistic functions; 3) etiology; and 4) public school involvement in diagnosis.

Prevalence. If the prevalence of such specific learning disabilities proved to be as high as other research studies seemed to indicate, the problem could not be solved with special class placement, whether it be a self-contained classroom, or a resource room program. The solution appeared to demand involvement of the only professional group available in sufficient numbers in public schools, i.e., regular classroom teachers.

In 1964 it was estimated that approximately one out of ten school children of normal intelligence was unable to learn at a level commensurate with his mental ability. Such cases of failure to learn could not be traced to low intelligence, instructional deficits, sensory defect, family mobility, or other social or emotional factors. If the prevalence figures proved to be as high as current research seemed to indicate (Haring & Ridgeway, 1967; Frostig, 1962; Myklebust, 1968), i.e., between 5% and 15% of the total school population, it seemed unreasonable to expect that the needs of these children could be met by special class placement, the current practice in many public school districts, especially in the State of Illinois. If these incidence figures were generalized, they would mean that every classroom teacher would have two or three such children each day in her classroom. These figures also suggested that the only group of specialists large enough to meet the needs of these children were the classroom teachers. However, it was also clear that classroom teachers did not have the specialized skills necessary for programming instruction to train

psycholinguistic disabilities. Therefore, it was proposed that specialists be utilized who would be able to program remediation to meet the pattern of psycholinguistic disabilities found in individual children in such a way that the program could be carried out in the classroom by the classroom teacher.

Trainability of Psycholinguistic Functions. The trainability of certain psycholinguistic functions frequently found to be associated with specific learning disability had been demonstrated by other researchers, but only in a clinic setting involving an intensive individualized program of remediation. The feasibility of incorporating these remediation techniques into public school setting, utilizing classroom teachers who would carry out carefully programmed remediation activities, needed to be demonstrated. The more relevant of the studies involving the trainability of the psycholinguistic correlates of learning had been reported by Kirk (1966). Similar studies reported by Frostig (1964), Beery (1967), Hirsch (1963), Hart (1963), Herman (1963), Smith (1962), and Painter (1966), confirmed the value of remedial teaching for children with learning disabilities. Painter's study was the only one of these that attempted to plan a remedial program which could be executed in a group situation within a regular public school. Wiseman (1965) had attempted to program remediation for retarded children with psycholinguistic disabilities to be carried out by classroom teachers within the framework of a private residential school. Kenny (1964) had reported diagnostic and classroom procedures for remediation of psycholinguistic disabilities in children of normal intelligence. The work of these authors suggested that intensive diagnosis could and should be done within the framework of the public school, if the responsibility for teaching children with specific learning disabilities is to be considered part of public school responsibility. The procedure of remediation described in these previous works could feasibly be carried out by a skilled classroom teacher if the programming had been done by specialists who continued to support her when additional help became necessary

Emphasis on Etiology. Research emphasis on etiology of learning disabilities, with a resultant lack of agreement, had not led to an educationally sound program which could be implemented in the public schools. The classroom teacher was still left with the problem of teaching these children every day, regardless of how much knowledge she may have received on why they were not able to learn by ordinary teaching methods. Programming based upon intensive diagnosis of the behavioral symptoms of learning disabilities seemed a possible answer to this problem.

A survey of the literature on causes of learning disability, or specific reading disability, indicated that there was little agreement

on specific causes, although current opinion seemed to be coalescing on cerebral dysfunction and/or motivational factors as primary causes of severe learning disability. Much research effort was being expended attempting to relate the behavioral symptoms of severe learning disability to some organic defect, measureable neurologically or psychologically. In most cases where clearcut brain damage could not be found, the learning disability was explained as the result of a disturbed or delayed pattern of neurological organization, or of minimal brain injury. Thus, the literature revealed theories relating specific learning disability to organic defect or dysfunction of the central nervous system as well as to glandular dysfunction. Other research emphasized the emotional component of specific learning disabilities, whether as cause or effect. In spite of a vast body of research data, however, the causes of specific learning disabilities were not known. Research in the fields of neurology and education had shown no obvious correlation between the neurological diagnosis and the peculiar pattern of strengths and weaknesses revealed by disabled learners.

Sound educational planning for children with "extreme discrepancies between ability and achievement associated with minimal cerebral dysfunction, psycholinguistic disabilities, or perceptual impairments" seemed to suggest the necessity of utilizing all that was known about the relationship between school achievement and cerebral dysfunction in symptomatic treatment of the disability. Such symptomatic treatment of the disability needed to be based upon an intensive behavioral diagnosis of the disability, rather than on a study of etiology, if a realistic program of remediation was to be devised which could be implemented by the classroom teacher.

Public School Involvement in Diagnosis. At that time, in the early 1960's, adequate diagnosis of specific learning disabilities was largely confined to agencies outside the public schools, i.e., university reading clinics, the Institute for Language Disorders, the Institute for Research on Exceptional Children, private or university connected child guidance clinics, clinics connected with medical schools or hospitals, etc. Lack of knowledge of public school personnel, methods, problems and services frequently caused a gap in communication which resulted in nothing being done in school to implement the recommendations of the clinic team, no matter how excellent they may have seemed to the diagnosticians. Diagnosis within the framework of the public schools, by persons familiar with the school system who could carry the burden of remediation, was seen as a way of bridging this gap so that some change in teaching method or in materials could be seen in the classroom.

The need to resolve these four issues involving prevalence, etiology, diagnosis, and remediation led directly to the organization of the research and demonstration project described in this report.

Although those involved with the program were committed to the necessity of involving public schools in services to children with learning disabilities, it was not suggested that this program of intensive diagnosis leading to remediation by classroom teachers would meet the needs of all children with specific learning disabilities. It was accepted that among these children with severe learning disabilities were some who could not possibly function outside of a self-contained classroom. Others were assumed to need the more intensive program involved in a resource room. However, it was proposed that a large majority of these children with a disorder or delay in the use of symbolic language could function in a regular classroom if they were given special assistance in overcoming their handicap: It is with this large group of children that this project has been concerned. A diagnostic-consultant service within the school district was seen as filling a need which was being met inadequately through the utilization of private tutors, remedial reading clinics, mental health clinics, child guidance centers, private psychologists, and school psychologists. It was hoped that the problem of translation of diagnostic information to the classroom teacher would be reduced considerably through the consultant service and through the utilization of the classroom teacher in carrying out the program of remediation.

Description of the Study

The learning situation which has been demonstrated included regular classroom teachers as well as itinerant learning disability teachers, i.e., psychoeducational diagnosticians. The involvement of regular classroom teachers was seen as a third step in a three part process involving intensive diagnosis, clinical teaching, and consultation with the classroom teacher.

The initial phase of the program for each child was devoted to intensive diagnosis of psycholinguistic disabilities. In this phase, psychoeducational diagnosticians were utilized in conjunction with the school psychologists, speech correctionists, social workers, and the Director of Special Services in a miltidisciplinary diagnostic team approach to children with specific learning disabilities. The psychologists continued to do those aspects of the diagnosis most clearly related to psychological functioning. In addition they included in the psychological battery many of the tests found useful in the diagnosis of specific learning disabilities. The psychoeducational diagnosticians utilized those tests and procedures for which their training equipped them. In general, these techniques involved diagnostic reading tests, tests of visual and auditory perception, tests of motor functioning, learning methods tests, and measures of psycholinguistic functioning. The responsibility for the integration of the psychological and the educational test data fell to the Director, who, with the psychoeducational diagnosticians and the school psychologists, programmed remediation based on the diagnostic hypothesis.

The second phase of this program involved individual remediation programs for each child, carried out on a short term, experimental basis by the psychoeducational diagnosticians. This clinical teaching aspect of the program took place in the school which the child would normally attend, after a staff conference with school faculty members involved in his school learning program. As soon as the clinical teaching program had been structured in such a way that it could be feasibly carried out by the classroom teacher or by other specialists in the building, i.e., the speech correctionist or the physical education teacher, the primary focus for remediation was transferred to the classroom. This structuring included formulation of educational objectives, collection of suitable materials, preparation of teacher-made materials, and preparation of lesson plans which were pretested in the individual clinical teaching phase of the program.

The third phase of the program focused on consultant service to the teachers by the psychoeducational diagnosticians. This consultation involved providing additional special methods and materials appropriate for each child as his needs changed or as one aspect of remediation was completed. Utilization of suggestions of the teachers has been an integral part of the program.

The Report

The report of this project is organized as follows:

Chapter I has discussed the specific objectives of the study, the background of the problems, issues in the field, and the scope and limits of the study.

Chapter II presents demographic data about Schaumburg District 54, the selection criteria and data about the kinds of services that were provided and the age and sex of the children who received them. From the data presented in this chapter, inferences can be drawn about the prevalence of learning disabilities in public school districts similar to District 54.

Chapter III compares the resource room program with the itinerant program in a systematic exploration of the effectiveness of serving children with specific learning disabilities by the diagnostic-remedial-consultive approach of the itinerant program as contrasted with the more traditional methods of handling the problem.

Chapter IV introduces and deals with the psychological and psycholinguistic characteristics of the children included in the study. From the analysis of clusters of disabilities, statements can be made about the existence of patterns of disabilities in the population under study.

Chapter V introduces and deals with data from the Developmental First Grade, a program for the early identification of high-risk children. This program was a derivative of the learning disability program.

Chapter VI presents data about the social behaviors of children with learning disabilities as rated by teachers and mothers before and after remediation. A comparison was made between the social behaviors of emotionally disturbed, learning disabled, and normal children.

Chapter VII includes selected case studies of children who have been served in the program. An effort has been made to select children with dissimilar deficits in the psychological processes which underlie learning.

Chapter VIII discusses the clinical teaching aspect of the psychoeducational diagnostician's role emphasizing the role of academics in the program of remediation.

Chapter IX summarizes the experience of District 54 in attempting to meet the needs of children with special learning disabilities.

## CHAPTER II

## Description of the Project

The purpose of this program was to demonstrate ways in which a public school system could mobilize existing resources to provide services for children with specific learning disabilities. In the preceding chapter the main issues in the field at the time that this study was proposed were discussed. It was apparent that more effective methods needed to be devised in order to serve more children who were being diagnosed as having specific learning disabilities. A brief description of the study was presented.

In this chapter the setting in which the program was implemented will be described. The selection criteria will be detailed, as well as the kinds of services rendered and the subjects involved in the program. Some inferences in regard to the prevalence of learning disabilities in districts like Schaumburg will be discussed.

Locus: Schaumburg School District 54

Schaumburg Township is located 30 miles northwest of Chicago. In 1954 the area was primarily agricultural, broken into large farms of 200-300 acres. Because of the strategic location in close proximity to O'Hare Field and toll roads leading to Chicago, large real estate developers laid out planned communities within the township and built hundreds of homes per year.

Fifteen years ago District 54 consisted of one white frame schoolhouse, with 77 students. In September, 1968, the doors of 16 buildings were opened to 10,500 students. In 1969 there were 17 buildings and 12,000 students.

Over this fifteen year period the average increase in student population has been 32% per year. The average assessed valuation per enrolled student has ranged between ten and eleven thousand dollars. Of the 119 school districts in Cook County, only four had a lower assessed valuation. Schaumburg School District 54 is not a wealthy district. The bricks and mortar problems involved in building 15 new schools in a ten year period have been duplicated in many suburban communities adjacent to large cities throughout the country.

The problems of curriculum, personnel, and program development have also been typical. The solutions which have evolved in District 54 may not have been quite so typical. In spite of limited funds, and prior to the passage of mandatory legislation in Illinois, District 54 united with nine other school districts to form the Northwest Suburban

Special Education Organization, in an effort to meet the educational needs of all children who deviated sufficiently from the norm that they could not be served adequately in the regular classroom.

Through this joint agreement, District 54 was able to place in special classes those children whose disability occurred with such low incidence that there were not enough children in the district to provide a sequential educational program. The deaf and hard-of-hearing were placed in classes within the ten districts comprising the joint agreement. The blind were sent to District 21, also a member of the cooperative. The physically handicapped were transported to a special class in Elgin, ten miles west of District 54. The trainable mentally handicapped were placed in one of three community schools, with transportation and tuition being paid by District 54. The educable mentally handicapped were placed in one of five special classes conducted within the district, a preprimary class, a primary class, a lower intermediate class, an intermediate class, or a junior high class. The partially seeing were taught by a specially trained teacher and provided with the materials, equipment, and services necessary to learn in spite of their visual impairment. The socially maladjusted were served either by special class placement in one of the two classes conducted within District 54, or by one of the four social workers or the guidance counselors employed by the district. The speech impaired were taught by seven specially trained speech correctionists within their own buildings. Four nurses employed by the district attended to special health problems and were responsible for the health program in the schools. The needs of most children with observable disabilities had been met adequately within School District 54.

As these programs have been developed, and the most obviously handicapped children provided for, another group of handicapped children had emerged for whom no service was available. This was the group of children with specific learning disabilities. The child with normal intelligence and reasonably adequate emotional adjustment who was not learning in school, despite the finest teaching, presented the greatest unsolved problem in the public schools of District 54, as is true of most schools in other districts.

Attempts had been made to meet the needs of the most severely involved learning disabled children with two resource rooms for perceptually handicapped children, one primary and one secondary. Under the Illinois Plan for Maladjusted Children, Type B, a public school district was reimbursed by the State $3500 per professional worker for special education programs for children with "extreme discrepancies between ability and achievement associated with minimal cerebral dysfunction, psycholinguistic disabilities, or perceptual impairments." The resource room program required that a child be transferred from the school he would normally attend to Hillcrest School, that he be placed in a

regular grade (first, second, third, etc.), and that he receive individual tutoring for one period a day. The numbers of children were, of course, limited to the number of periods in the teacher's day, and could not exceed ten children per resource room teacher. This program was quite successful for the children fortunate enough to be placed in the class. At most, this kind of program served 20 children out of a total school population of 7500, or two-tenths of one percent! In order to serve a realistic proportion of the school population with learning disabilities with the resource room program, it would have been necessary to open 58 more resource rooms, and hire 58 more specially trained teachers.

In a school district which has recently achieved the dubious distinction of being the fastest growing district in Illinois, and is the fourth lowest in assessed valuation in Cook County, it became imperative to move toward a more realistic program of service to children with special learning disabilities. It was apparent that an innovative approach to the problems presented by these children was necessary, since existing models were barely able to skim the surface of the problem. Thus, the research-demonstration program was conceived, utilizing existing resources in an innovative model of service which included the classroom teacher. The effectiveness of the model, conceived in 1963-64, is most eloquently attested to in the numbers of Title III projects and programs funded by state departments of education and local districts throughout the nation which have drawn heavily on these concepts. The wide acceptance of some of the basic philosophies underlying the project make it sound less innovative today than it was when it first began. Since September 1965, a total of over 4329 visitors from over 500 school districts have come to Schaumburg to observe the program. Dissemination of information in response to written requests has been staggering, with over 8000 letters and requests for information having been received. It has not been possible for the personnel involved to attend all of the PTA meetings, in-service programs, conferences and workshops for which requests have been received. Efforts have been made to refuse as few as possible, especially from public school systems or state departments of education who seemed sincere in their efforts to initiate new programs. Personnel from District 54 have been involved in more than 200 conferences, workshops, demonstrations and lectures sponsored by universities, professional organizations, school systems, or parent groups as part of the dissemination function of the project.

The most relevant criterion of a successful program is the willingness of the Board of Education to assume financial responsibility for the program after Federal funding has been terminated. The Board of Education in Schaumburg District 54 has continued the program intact, ever since the demonstration project was concluded. The program has been expanded each year, with the addition of new positions for psycho-educational diagnosticians. In addition, the resource room program has been expanded to cover all grade levels. Thus, after Federal

funding ceased, eight diagnosticians served 17 elementary buildings, with a total population of 12,162 elementary school children. The program has continued to grow since that time, keeping pace with the development of the district.

Selection Criteria

In the original proposal, written in 1964, it was proposed that the service be established for children "with serious educational maladjustment resulting from extreme discrepancy between ability and school achievement associated with such factors as perceptual impairment, specific learning disabilities, and neurological involvement", as described in the Rules and Regulations of the Office of the Superintendent of Public Instruction of the State of Illinois.

In general, a discrepancy of two years between ability and achievement was deemed necessary to meet the criterion of "extreme discrepancy." However, it has been necessary to modify this criterion in order to make it operational. For the purpose of this program, a discrepancy of one year in a first or second grade child was considered extreme enough to constitute a diagnosis of specific learning disability.

The criteria for selection have been drawn directly from Kirk's early definition: " 'Severe learning disability' refers to a retardation, disorder, or delayed development in one or more of the processes of speech, language, reading, spelling, writing, or arithmetic, resulting from possible cerebral dysfunction and/or emotional or behavioral disturbance and not from mental retardation, sensory deprivation, or purely cultural or instructional factors" (Kirk, 1962).

The more recent definition proposed by the National Advisory Committee for the Handicapped followed the same definition: "Children with special learning disabilities exhibit a disorder in one or more of the basic psychological processes involved in understanding or using spoken or written languages. These may be manifested in disorders of listening, thinking, talking, reading, writing, spelling or arithmetic. They include conditions which have been referred to as perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia, developmental aphasia, etc. They do not include learning problems which are due primarily to visual, hearing, or motor handicaps, to mental retardation, emotional disturbance, or to environmental disadvantage." (National Advisory Committee For the Handicapped, 1968)

In order to find those children who most nearly fit this definition, the details of the program were discussed with the entire staff at a preschool workshop held on August 31, 1966. This general meeting was supplemented by meetings of each professional group in the Department of Special Services, so that the entire Special Services staff would be able to assist teachers and principals in selecting children in

their classes who met the criteria for selection. In addition, at a special administrators meeting, each principal was asked to hold a building meeting devoted to identifying those children in that building who might fit the description. Each teacher sent to the principal a list with the child's name, birthdate, CA, I.Q., and latest reading scores. The principal then calculated the Reading Index on these children, using Monroe's formula (Monroe, 1932):

$$\frac{\text{CAge + MAge + Arithmetic Computation}}{3} = \text{Expectancy Grade}$$

$$\frac{\text{Reading Grade}}{\text{Expectancy Grade}} = \text{Reading Index}$$

In this formula, an expectancy grade is derived from the mean of the chronological age grade expectancy, the mental age grade expectancy, and the grade score in Arithmetic Computation. A ratio or Reading Index is then derived between the mean of the reading grade scores and the expectancy grade. Those children who on the basis of the group test data and teacher estimate appeared to meet the criterion of extreme discrepancy between ability and achievement were administered an individual battery of achievement tests. The following tests were included at this stage of the identification process:

a. Gray's Oral Reading Paragraphs;
b. Gate's Silent Reading Test (Type 3);
c. Arithmetic Computation portion of the Stanford Achievement Test;
d. Ayre's Spelling Test;
e. Iota Word Test;
f. Word Discrimination Test.

From this data, the average grade score for the battery of reading tests was obtained, and divided by the expectancy grade to obtain a Reading Index. All children with a Reading Index below .80 were considered eligible for further testing and diagnosis, including an individual intelligence test, usually the Stanford-Binet or a Wechsler Intelligence Scale for Children, an Illinois Test of Psycholinguistic Abilities, the Frostig Tests of Visual Perception, the Wepman Auditory Discrimination Test, and the Visual-Motor Integration Test. From this population of poor readers were selected those children who met the following criteria;

1. A two-year deficit between a subtest and average language age on the ITPA; or,
2. A total of 108 months discrepancy between total language age and all subtest scores on the ITPA; or
3. A two-year discrepancy between MA grade expectancy

and achievement scores, with significant deficits on tests of visual or auditory perception (for children in first or second grade).

In addition to meeting these quantitative criteria, data concerning social, emotional, physical and experiential background were carefully evaluated in a full staff conference attended by the classroom teacher, the speech correctionist, the nurse, the social worker, the diagnostician, the psychologist, the principal, and the Director of Special Services. Eligibility for the learning disability program was determined by consensus of those attending the staff conference.

The most difficult decisions involved those children who were excluded because of emotional, social, or cultural factors. In most cases, the discrepancy between ability and achievement was not considered great enough to warrant inclusion. In other cases, it was felt that the severity of the disability warranted the more intensive service of the resource room program.

As integration of the staff developed, the staff members became aware of identifying characteristics of children with learning disabilities, the selection process moved more rapidly, and expanded into other types of learning disabilities than were associated with reading, i.e., problems in concept formation, visual-motor integration, arithmetic, etc.

In this manner it was possible to identify children who needed service because of deficits in the psychological processes which underlie learning.

Services Provided

In this section, data about the kinds of services that were provided and the kinds of children who received the services will be presented. From this analysis of the nature of the services, the age of the children involved, the sex of the children, as well as changes in these variables over the three-year period covered by the study, can be gleaned information basic to the establishment of new programs. It is also from the data presented in this chapter that inferences can be drawn about the prevalence of learning disabilities in public school districts similar to District 54.

One of the specific objectives of the study has been to demonstrate that service to children with specific learning disabilities can be provided through a combined diagnostic-remedial-consultative approach. A second objective has been to demonstrate that more children with specific learning disabilities can be served by such an approach

than had been accomplished by placing such children in special resource rooms.

A major problem present in the schools that prompted the study involved the large numbers of children who needed service, and the lack of trained personnel available. It seemed apparent that the only professional group present in sufficient numbers to serve the large number of children needing service was composed of the classroom teachers. Thus, the major focus of the study was to involve classroom teachers in remediation based upon the prescription written by the psychoeducational diagnostician after careful diagnostic evaluation.

Table I presents the data on the diagnostic services provided, either consultation, minimal diagnosis, or extensive diagnosis. Consultation refers to observation of the child's behavior and recommendations to the teacher for classroom management. For example, a first grade teacher may have asked for help for a child with severe reversals of numbers and letters. After observing the child's performance at his desk and at the blackboard, the diagnostician may have provided the teacher with a workbook and teacher's manual for the Write and See (Skinner, 1969). This type of service would have been listed as consultation, since the child was not seen individually for diagnostic testing or remediation.

The category of minimal diagnosis included those children tested individually with less than a complete diagnostic battery. In many cases, the Frostig Tests of Visual Perception were administered, and yielded significantly low scores warranting immediate remediation without further diagnosis. The same was true of the Wepman Auditory Discrimination Test, or of any of the other tests included in the complete battery.

The category of extensive diagnosis included those children who were administered a complete diagnostic battery of tests. As will be discussed in detail in Chapter VII, the complete diagnostic battery varied somewhat with the age of the child, but included measures of cognitive functions, i.e., intelligence, psycholinguistic development, visual perception, visual-motor integration, auditory discrimination and academic achievement.

It can be seen in Table I that a total of 1238 children were seen as part of the diagnostic function of the psychoeducational diagnostic during the three year period covered by the study. Of these, 915 were boys, and 323 were girls, or a ratio of three boys to one girl.

During the 1965-66 school year, there was a total school population in grades 1 through 6 of 4667 children. Of the total population, 218 children were referred for diagnostic evaluation, giving a referral rate of 8.7%.

It is difficult to interpret these figures since the school population was not constant from year to year. In addition to children who move into District 54 at the rate of over 1000 per year, or a 10% increase each year, approximately 300 children move out of the district. During the first year of the project, there were many more referrals than could be seen by the two diagnosticians, thus unrealistically reducing existing prevalence data. During the third year of the study with the staff increased to six, the referral figure of 8.7% was probably still unrealistically reduced by the number of children who had been seen the previous years.

If the total number of children seen during the three-year period (1238) is compared with the average school population in grades 1 through 6 of 6650, approximately 18% of the population was referred for diagnostic service because of learning problems. Of this 18% who were referred for diagnostic service, 179 or 2.7% were diagnosed as having specific learning disabilities. The learning problems of the rest of this group could be handled by the classroom diagnosticians. This figure may be somewhat elevated by the fact that the population of the district is a mobile one and shifts both in and out without increasing numerically.

During the first year of the program, 1965-66, two diagnosticians were able to diagnose 218 children, or an average of 109 children per professional worker. As the staff increased in size, this average dropped to 99 children per worker. During the third year, 104 children were seen for diagnostic purposes by each diagnostician.

Table 2 presents the data on the remediation services rendered children by the psychoeducational diagnosticians, the resource room teacher, or by the classroom teacher during the same three-year period. A total of 990 children, 676 boys and 314 girls, received individually prescribed remediation following a diagnostic evaluation. Of this total, the largest group (780) was handled by the classroom teacher under the guidance of the psychoeducational diagnostician. There were 179 children, or 2.7%, who required intensive remediation by the diagnosticians, and 31 children required placement in the resource room program.

The information in regard to prevalence which was deduced from these figures was similar to the data derived from the figures on diagnosis. During the third year, 104 children were seen for diagnostic purposes by each diagnostician.

The information in regard to prevalence which was deduced from these figures was similar to the data derived from the figures on diagnosis. During the 1965-66 school year, 225 children, or 3.8% of the population, received remediation for specific learning disabilities ranging from mild to severe. During the 1966-67 school year, 289 children,

TABLE 1

Diagnostic Services Rendered to Children

Psychoeducational Diagnosis

| Year | Consultation | | Minimal | | Extensive | | Totals | | | Mean No. of Cases |
|---|---|---|---|---|---|---|---|---|---|---|
| | Boys | Girls | Boys | Girls | Boys | Girls | Boys | Girls | Total | |
| 1965-1966 2 PED's | 17 | 10 | 41 | 20 | 106 | 24 | 164 | 54 | 218 | 109 |
| 1966-1967 4 PED's | 96 | 27 | 71 | 43 | 111 | 48 | 278 | 118 | 396 | 99 |
| 1967-1968 6 PED's | 161 | 88 | 74 | 31 | 238 | 32 | 473 | 151 | 624 | 104 |
| Total 3-year Period | 274 | 125 | 186 | 94 | 455 | 104 | 915 | 323 | 1238 | |

TABLE 2

Remediation Services Rendered to Children

| Year | Classroom Teacher | | | Itinerant Program | | | Resource Room | | | Totals |
|---|---|---|---|---|---|---|---|---|---|---|
| | Boys | Girls | Total | Boys | Girls | Total | Boys | Girls | Total | |
| 1965-1966 2 PED's | 92 | 37 | 129 | 59 | 13 | 72 | 20 | 4 | 25 | 225 |
| 1966-1967 4 PED's | 155 | 81 | 236 | 36 | 12 | 48 | 5 | 0 | 5 | 289 |
| 1967-1968 6 PED's | 268 | 147 | 415 | 41 | 18 | 59 | 0 | 2 | 2 | 476 |
| Total 3-year Period | 515 | 265 | 780 | 136 | 43 | 179 | 25 | 6 | 31 | 990 |

The information in regard to prevalence which was deduced from these figures was similar to the data derived from the figures on diagnosis. During the 1965-66 school year, 225 children, or 3.8% of the population, received remediation for specific learning disabilities ranging from mild to severe. During the 1966-67 school year, 289 children, or 4.5% of the school population, required remediation. During the 1967-68 school year, 476 children, or 6.6% of the school population received remediation. During the three-year period, 990 children received individually prescribed remediation, with only 179 needing intensive remediation service. Had the population remained constant during this time, a fairly accurate prevalence figure could have been reported. However, each year over 1000 children graduated from the eighth grade. In addition, many new children moved into the district to replace those who had moved out. Thus, prevalence figures would be artificially reduced since the population base from which the subjects were drawn was actually larger than it appeared to be at any given time because of the mobility within the group.

In summary, 990 children received individually prescribed remediation during the three-year period in the itinerant program. During the same period, 31 children were served in the three resource rooms where enrollment was limited by state rules and regulations to 10 children per teacher. Of the 990 children involved in remediation, 179 were seen in intensive programs by the psychoeducational diagnosticians.

## CHAPTER III

### A Comparison of the Resource and Itinerant Programs

In the previous chapter, data were presented which indicated that a significantly greater number of children can be served in the itinerant learning disability program than in the resource room program. This phase of the study focused directly on the third of three specific objectives of the program, i.e., to demonstrate that more children with specific learning disabilities could be served by a combined diagnostic-remedial-consultative approach than by more conventional methods.

In this chapter, the children in the resource room program are compared with matched subjects in the itinerant program on measures of psycholinguistic abilities, visual perception, visual-motor integration, and school achievement, in order to determine which of the two programs served the children more effectively.

### Similarities and Differences in the Resource and Itinerant Programs

Eligibility for both the resource room program and the itinerant program was determined in a staff conference attended by the psychologist, the social worker, the nurse, the speech correctionist, the psycho-educational diagnostician, the classroom teacher, the resource room teacher and the principal. Initially the more severely disabled learners were placed in the resource room program, which required that the child be bussed to the building in which the resource room operated, be enrolled in a regular classroom, and go to the special class one period a day, five days a week. It soon became apparent that this program could help a very limited percentage of the children who needed service. Those disabled learners who could not be placed in the resource program because of the limited number of placements available, were served through the itinerant program. In this program, the psycho-educational diagnostician served more than one building and was responsible for diagnosis, clinical teaching, and consultation with the regular classroom teacher. In many cases, the children in the itinerant program were as severely disabled as those in the resource room, although efforts were made to serve the less severely disabled in the itinerant program, and the more severely disabled in the resource room program.

In many ways, the two programs were similar. The most obvious difference involved bussing children to a school not attended by the other children in their neighborhood. The other important difference involved the learning disabilities resource room teacher. Since she remained in one building all day, she could also serve as a crisis room teacher if the child's behavior could not be handled in the regular class. With these exceptions, the programs had similar eligibility requirements, the types of children involved were similar, and the methods and materials used in remediation were similar. The focus of the itinerant program was placed on the regular classroom teacher, attempting to involve her in remediation in the classroom as quickly as possible. Every effort was made in the itinerant program to reduce the dissociation from the mainstream that seemed to be a part of the resource room format. The psychoeducational diagnosticians urged the regular teacher to take over the remediation program as quickly as possible, furnishing special materials and equipment when feasible. For example, many first grade teachers were quite willing to include the Frostig Program of Visual Perception in their classroom activities, especially when the diagnostician tested those children who were having difficulties, put the entire program on tape, brought a listening station with headsets to the classroom, supplied the appropriate dittoed sheets and manual, and showed the teacher how to use the program. Thus, the focus of remediation was in the regular classroom whenever possible, not in the special class. This involvement of regular class teachers in the program of remediation was the most important difference between the two programs.

Another important difference between the two programs involved scheduling i.e., the number of minutes per day and days per week which were spent with each child. In the resource room programs, a maximum of ten children were seen individually at least one period per day, five days per week. During the last year, more flexible scheduling was planned, permitting some grouping of children with similar disabilities, in addition to individual tutorial work. Many activities involved in remediation were found to be more interesting to the children if an element of competition could be introduced, thus lending themselves better to group participation than to a tutorial situation. It was also found that some children had no problem learning when they had all of the teacher's attention, but needed to be taught how to learn independently, and to screen out distracting stimuli. A typical daily schedule in the primary resource room might be as in Table 3 where the resource room was assigned a regular classroom, or as in Table 4 where a smaller office-type room was used.

The scheduling of the resource room resulted in more minutes per week spent with the learning disabilities teacher than did the scheduling of the itinerant psychoeducational diagnosticians. The first year of the project, two diagnosticians spent two half-days per week in each of five buildings, serving three children in each building, or fifteen children pre week. Each child was seen twice a week, with remediation

in the classroom by the classroom teacher five days per week. During the second year, four diagnosticians served three buildings each, seeing each child three times a week. During the third year, six diagnosticians served 13 buildings, and were in each building four half-days per week, thus approximating the number of days per week in which the children in the resource room were seen.

In as much as the itinerant program was seen as a possible improvement over the more conventional resource room program, it seemed imperative to evaluate the efficacy of the two programs. The purpose of this section is to compare the effects of the programs upon psycholinguistic abilities, visual perception, visual-motor integration, and school achievement, in order to determine which of the two programs served the children more effectively.

Method

Thirty children, 24 boys and 6 girls, in the resource room program were matched with 30 children selected from over 300 children involved in the itinerant program, on six variables, WISC I.Q., chronological age on entrance into the program, achievement, length of remediation, sex, and organicity. The subjects were individually matched on I.Q. within six months, on achievement within three months, on length of remediation within three months, and on sex and organicity.

Table 5 presents summary information for these matching variables. It can be seen that the two groups of matched pairs were relatively comparable on C.A., I.Q., estimate of achievement, and length of remediation. Chronological ages ranged from 6-0 to 11-0, with a mean of 96 months for the resource subjects, and 93 months for the itinerant subjects. WISC intelligence quotients ranged from 65 to 120, with a mean Full Scale I.Q. of 92 for both groups. Estimates of achievement ranged from 1.0 to 2.0 when the subjects entered the project, with a mean of 1.6 for the resource room, and 1.2 for the itinerant subjects. Since it is very difficult to secure accurate test results for most young children with specific learning disabilities, their teachers were asked to report the reading level at which the child could succeed. Thus, the teacher's estimate reflects the child's level of competence rather than a test score of questionable validity. The mean length of remediation for the resource room subjects was 19.3 months, and 16.9 months for the itinerant subjects.

The most difficult of the variables on which to match was that involving the presence or absence of organic involvement. Of the 30 children in the resource room program, 12 children, or 33 1/3% of the subjects, had been medically diagnosed as having organic involvement. The diagnoses ranged from that of "unquestionable brain damage due to a birth injury

TABLE 3

SCHEDULE FOR MODIFIED RESOURCE ROOM

(Regular-Size Classroom)

| | Monday | Tuesday | Wednesday | Thursday | Friday |
|---|---|---|---|---|---|
| 9:00-10:15 | 2nd & 3rd Grade Reading & Language | 2nd & 3rd Grade Reading & Language | 2nd & 3rd Grade Reading & Language | 2nd & 3rd Grade Reading & Languag | 2nd & 3rd Grade Reading & Language |
| 10:15-10:30 | 2nd Grade Recess | 2nd Grade Recess | 2nd Grade Recess | 2nd Grade Recess | 2nd Grade Recess |
| 10:30-11:30 | 2nd & 3rd Grade Arithmetic | 2nd & 3rd Grade Arithmetic | 2nd & 3rd Grade Arithmetic | 2nd & 3rd Grade Arithmetic | 2nd & 3rd Grade Arithmetic |
| 11:30-11:45 | DFG Language Individual Instruction | DFG Language Individual Instruction | DFG Language Individual Instruction | DFG Language Individual Instruction | DFG Language Individual Instruction |
| 11:45-1:00 | Lunch | Lunch | Lunch | Lunch | Lunch |
| 1:00-1:30 | 1st Grade Individual Work | 1st Grade Individual Work | 1st Grade Individual Work | 1st Grade Individual Work | 1st Grade Individual Work |
| 1:30-2:00 | 1st Grade Small Group Language | 1st Grade Small Group Language | 1st Grade Small Group Language | 1st Grade Small Group Language | 1st Grade Small Group Language |
| 2:00-2:30 | 1st Grade Individual Work | 1st Grade Individual Work | 1st Grade Individual Work | 1st Grade Individual Work | 1st Grade Individual Work |

TABLE 4

SCHEDULE FOR PRIMARY RESOURCE ROOM

| | Monday | Tuesday | Wednesday | Thursday | Friday |
|---|---|---|---|---|---|
| 9:00-10:00 | 3rd Grade Reading & Language N=4 | 2nd Grade Reading & Language N=4 | 3rd Grade Reading & Language N=4 | 2nd Grade Reading & Language N=4 | 3rd Grade Reading & Language N=4 |
| 10:00-10:20 | 2nd Grade Recess | 2nd Grade Recess | 2nd Grade Recess | 2nd Grade Recess | 2nd Grade Recess |
| 10:20-11:45 | 1st Grade Language, Beginning Reading, Arithmetic, Visual Perception Skills N=4 | 1st Grade Language, Beginning Reading, Arithmetic, Visual Perception Skills N=4 | 1st Grade Language, Beginning Reading, Arithmetic, Visual Perception Skills N=4 | 1st Grade Language, Beginning Reading, Arithmetic, Visual Perception Skills N=4 | 1st Grade Language, Beginning Reading, Arithmetic, Visual Perception Skills N=4 |
| 11:45-1:00 | Lunch | Lunch | Lunch | Lunch | Lunch |
| 1:00-2:30 | 2nd Grade Reading & Language, Arithmetic N=2 | 3rd Grade Reading & Language, Arithmetic N=2 | 2nd Grade Reading & Language, Arithmetic N=2 | 3rd Grade Reading & Language, Arithmetic N=2 | 2nd Grade Reading & Language, Arithmetic N=2 |

to an assumption of "minimal brain dysfunction evidenced by hyperactivity, short attention span, and learning disabilities." Table 6 summarizes pertinent information on each subject in the resource room who had organic involvement. This information has been abstracted from the medical reports and case histories. Similar data on the six itinerant subjects with organic involvement are presented in Table 7.

Because of the variability in reporting neurological and EEG findings, and the differences in children even with similar neurological findings, the value of attempting to match on these kinds of data is questionable. However, the information has been included in this report in an effort to demonstrate the difficulties inherent in drawing any educational implications from typical medical reports.

## Procedure

Data on the child's psychoeducational development were obtained at the time of entering the project and after the period of remediation. The following instruments were used in collecting the data:

1. The Illinois Test of Psycholinguistic Abilities (ITPA, Experimental Edition) which measures nine of the psychological processes which underlie learning and the acquisition of language. Six of the subtests measure language development at the representational or meaningful level; the other three subtests measure the automatic level of functioning, including visual and auditory memory.

2. The Frostig Test of Visual Perception which measures five acres of visual perception, eye-motor coordination, figure-ground, form constancy, spatial relations, and position in space. This paper and pencil test is administered individually or in small groups of two or three children.

3. The Visual Motor Integration Test, which assesses the child's ability to copy increasingly more complex geometric figures. It is administered individually to each child.

4. The Iowa Tests of Basic Skills which assesses school achievement in several areas, the most relevant of which include vocabulary, reading, spelling, language usage, computation, and problem solving. This paper and pencil battery of achievement tests is given routinely every September from third grade through seventh grade.

## Statistical Analysis

Paired t-tests for mean differences of the matching and criterion variables among various conditions (pretreatment data, posttreatment data) and groups

TABLE 5

Means and Standard Deviations of Matching Variables for Resource Room and Itinerant Programs

| | Resource Room | | Itinerant | | |
|---|---|---|---|---|---|
| Variables | Mean | SD | Mean | SD | t |
| Chronological Age | 96.1 | 21.89 | 93.6 | 20.46 | .47 |
| WISC Full Scale I.Q. | 92.0 | 10.26 | 92.1 | 12.06 | .03 |
| Verbal I.Q. | 89.4 | 12.04 | 93.2 | 12.83 | 1.03 |
| Performance I.Q. | 94.8 | 12.09 | 92.5 | 12.70 | .63 |
| Estimate of Achievement | 1.6 | .96 | 1.2 | .79 | 1.75 |
| Length of Remediation | 19.3 | 7.19 | 16.9 | 6.05 | 1.41 |

TABLE 6

Summary of Medical Data on Resource Room Subjects

With Neurological Involvement

| Code | Neurological | EEG | Medication | Seizure Activity | Diagnosis |
|---|---|---|---|---|---|
| 493 | Negative | Abnormal | Dilantin Phenobarbitol | Yes | Belated Bobinski |
| 159 | Minimal positive findings | Negative | | None | Incoordination hyper-responsiveness |
| 046 | Positive | None | None | None | Mild right sided cerebral spastic |
| 040 | Negative | 14/6 spikes | Dilantin Phenobarbitol Dexedrine Deaner | None | Moderate organic brain damage |
| 498 | Positive | Abnormal | Tranquilizer | Grand Mal | Convulsive disorder with diffuse organic brain deficit |
| 499 | Positive | Very abnormal, multiple spike seizure foci | Dilantin Mebaril | Yes | Right spastic hemiplegia |
| 714 | Mildly positive | Abnormal | Dexedrine | None | Immaturity of the CNS |
| 010 | Positive | Abnormal | Mellaril | None | Mild diffuse CNS disorder |
| 050 | Positive | Abnormal | None | Yes | Cerebral damage (roseola enceph0 |

TABLE 7

Summary of Medical Data on Itinerant Subjects

With Neurological Involvement

| Code | Neurological | EEG | Medication | Seizure Activity | Diagnosis |
|---|---|---|---|---|---|
| 093 | None | Abnormal left mid-temporal & anterior temporal | Dilantin Phenobarbitol | Convulsions | |
| 140 | Normal | Positive w/seizure activity | Mellaril Dilantin | Some | |
| 153 | Normal | Positive | Phenobarbitol | None | Brain tumor removed from left parietal lobe |
| 408 | Abnormal | Positive | Tranquilizers | None | |
| 142 | | | | None | Cerebral anoxia w/congenital atelectasis |
| 141 | | | | None | Expressive aphasia |

(resource room, itinerant program) were computed. The intercorrelations (Pearson r) for the variables for both pretreatment and posttreatment data were computed for both resource and itinerant groups.

## Results

The results of the analysis of the differential effects of the program upon each of the psychoeducational variables will be discussed in the following order:

1. Psycholinguistic abilities
2. Visual perceptual abilities
3. Visual-motor integration
4. School achievement

1. Psycholinguistic Abilities. Since psycholinguistic abilities have been found to relate to reading as well as other school achievement (Kirk, 1966; Kass, 1966; McLeod, 1968), part of the educational intervention in both programs involved psychoeducational training. It seems appropriate, therefore, to examine the differential effects of the resource and itinerant programs upon the psycholinguistic abilities of the children in each group as measured by the experimental edition of the ITPA.

(a) Table 8 presents the means and standard deviations of the language ages for each of the ITPA subtests, total language ages, and psycholinguistic quotients for resource and itinerant children. It can be seen that the itinerant children in both pre and posttreatment data are consistently higher than the resource room children. The means are depicted graphically in Figure 1.

(b) Table 9 represents the t tests for the mean differences for the ITPA data for the pre and post-test scores for the 29 resource room children and the pre and post-test scores of 29 itinerant treatment children. It will be noted that:

(1) there are no significant differences between pre-test data for the resource group or the itinerant group;

(2) there are no significant differences between the pre-resource and post-resource group;

(3) there are significant differences on all tests between the pre-itinerant and post-itinerant group.

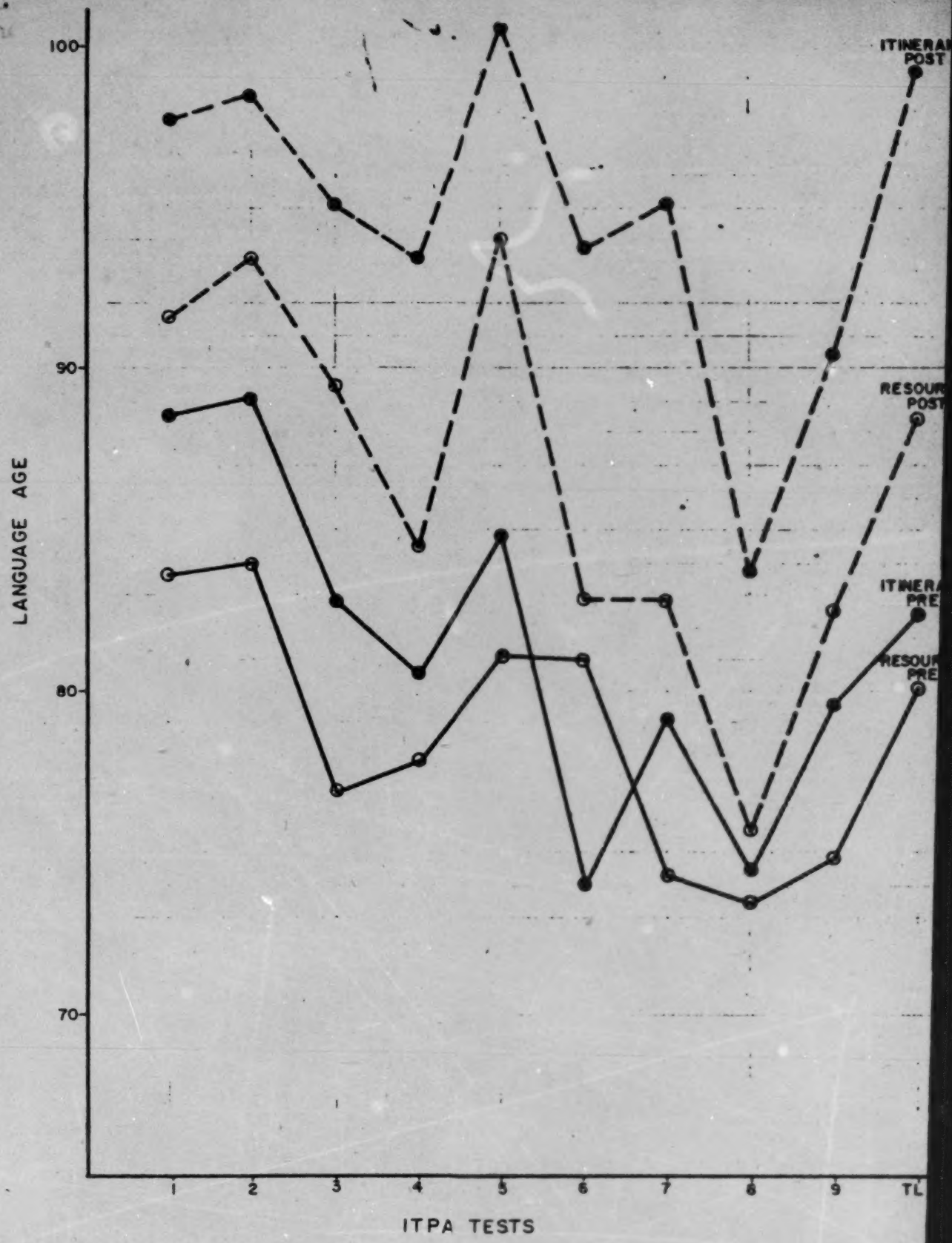
(c) In addition to the data of Table 9, it should be pointed out that the itinerant group showed greater gains on all subtests than did the resource room group. The itinerant group also gained on the average 16.8 months in total language age in a period of 16.9 months while the

TABLE 8

Means and Standard Deviations of ITPA Scores for Resource Room and Itinerant Matched Groups

(N = 30)

| | Resource | | | | Itinerant | | | |
|---|---|---|---|---|---|---|---|---|
| | Pre | | Post | | Pre | | Post | |
| ITPA Subtests | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| Auditory Decoding | 83.8 | 18.29 | 91.6 | 16.57 | 88.6 | 18.29 | 97.9 | 15.26 |
| Visual Decoding | 84.0 | 19.07 | 93.3 | 18.72 | 89.1 | 14.13 | 98.5 | 12.94 |
| Auditory-Vocal-Association | 76.9 | 21.43 | 89.5 | 16.00 | 82.9 | 17.42 | 95.1 | 13.67 |
| Visual-Motor-Association | 77.8 | 18.63 | 84.5 | 22.20 | 80.4 | 17.65 | 93.3 | 15.96 |
| Vocal Encoding | 81.2 | 22.34 | 94.0 | 17.26 | 84.9 | 27.19 | 100.7 | 12.35 |
| Motor Encoding | 81.0 | 24.28 | 82.9 | 22.36 | 74.0 | 19.07 | 93.7 | 17.19 |
| Auditory-Vocal-Automatic | 74.3 | 24.45 | 82.9 | 15.77 | 79.1 | 21.17 | 95.1 | 15.46 |
| Auditory-Vocal-Sequential | 73.5 | 20.95 | 75.8 | 21.26 | 74.4 | 17.80 | 83.7 | 17.09 |
| Visual-Motor-Sequential | 74.9 | 19.00 | 82.5 | 18.71 | 79.6 | 18.90 | 90.4 | 18.39 |
| Total Language Age | 81.1 | 21.46 | 88.4 | 17.13 | 82.4 | 14.52 | 99.2 | 15.13 |
| Psycholinguistic Quotient | 81.7 | 12.31 | 82.4 | 16.40 | 85.6 | 13.05 | 92.9 | 14.73 |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TL
ITPA TESTS

Figure 1

resource room group gained only 7.0 months in total language age in a period of 19.3 months.

(d) The general conclusion from this comparison is that although both groups made gains, the children in the itinerant program made greater gains than did children in the resource room programs measured by the experimental edition of the ITPA.

2. Visual Perception. Table 10 presents the means and standard deviations of pretreatment and posttreatment performances of both resource and itinerant subjects on the Frostig Test of Visual Perception. The means are presented graphically on Figure 2. Mean differences along with t values for significance of the differences are presented in Table 11. By inspection it would appear that there are only small differences in the means of the groups on the pretreatment data.

For the resource subjects, means on the five subtests ranged from 70.3 months to 82.6 months; for the itinerant subjects means ranged from 68.1 months to 86.4 months. Data in Table 11 indicates that none of the pretreatment differences between the two groups were statistically significant.

The gains for the resource group ranged from 3.7 months to 20.0 months and for the itinerant group from 6.1 to 26.0 months. The gains for the resource room subjects were not significant except for eye-motor coordination in which the mean gain was 20 months. The gains for the itinerant program subjects were significant, ranging from 13.6 months to 26.0 months, except for spatial relations, on which the gain was 6 months.

In summary, the results indicated that subjects in the itinerant program gained more than the resource room subjects on all subtests of visual perception, as well as on perceptual quotient with a gain of 17.5 P.Q. points as compared with a gain of 1.0 P.Q. points for the resource group.

3. Visual-Motor Integration. Table 12 presents means in months and standard deviations of age scores on the Beery-Buktenica Visual Motor Integration Test for resource and itinerant matched groups. T test for the significance of the differences in the means are presented in Table 13. An inspection of the means indicates that the itinerant group performed consistently higher than the resource room group at both pretreatment and posttreatment testing.

TABLE 9

t-Tests for Mean Differences between Pretreatment and Posttreatment Data on ITPA for Resource Room and Itinerant Matched Groups

(df = 29)

| ITPA Subtests | 1x3 Pre-Resource vs. Pre-Itinerant | | 1x2 Pre-Resource vs. Post-Resource | | 3x4 Pre-Itinerant vs. Post -Itinerant | |
|---|---|---|---|---|---|---|
| | $\bar{d}$ | t values | Gain | t values | Gain | t values |
| Auditory Decoding | 4.8 | .92 | 7.8 | 1.25 | 9.3 | 2.13* |
| Visual Decoding | 5.0 | 1.09 | 9.3 | 1.87 | 9.4 | 2.70* |
| Auditory-Vocal-Association | 6.0 | 1.09 | 12.6 | 1.82 | 12.3 | 3.03** |
| Visual-Motor-Association | 2.7 | .52 | 6.7 | .95 | 12.8 | 2.95** |
| Vocal Encoding | 3.7 | .51 | 12.8 | 1.76 | 15.8 | 2.90** |
| Motor Encoding | 7.0 | 1.16 | 1.9 | .23 | 19.7 | 4.18** |
| Auditory-Vocal-Automatic | 4.8 | .75 | 8.6 | 1.13 | 16.0 | 3.34** |
| Auditory-Vocal-Sequential | .8 | 1.55 | 2.2 | .30 | 9.4 | 2.09* |
| Visual-Motor-Sequential | 4.7 | .88 | 7.6 | 1.13 | 10.8 | 2.24* |
| Total Language Age | 1.3 | .25 | 7.2 | 1.04 | 16.8 | 4.34** |
| Psycholinguistic Quotient | 3.9 | 1.08 | .7 | .15 | 7.3 | 2.01 |

* $p < .05$

** $p < .01$

TABLE 10

Means and Standard Deviations of Frostig Test of Visual Perception Test Scores for Resource and Itinerant Matched Groups

| | Resource | | | | Itinerant | | | |
|---|---|---|---|---|---|---|---|---|
| | Pre | | Post | | Pre | | Post | |
| Subtests | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| Eye-Motor Coordination | 79.3 | 21.62 | 99.3 | 23.78 | 71.6 | 17.16 | 94.2 | 19.84 |
| Figure Ground | 71.7 | 22.20 | 82.9 | 16.27 | 70.6 | 16.90 | 91.2 | 13.74 |
| Form Constancy | 70.3 | 23.76 | 86.3 | 30.58 | 68.1 | 27.69 | 94.1 | 14.22 |
| Position in Space | 74.7 | 14.56 | 86.9 | 22.32 | 76.8 | 19.07 | 90.4 | 13.30 |
| Spatial Relations | 82.6 | 17.79 | 86.3 | 14.68 | 86.4 | 15.15 | 92.5 | 10.25 |
| Perceptual Quotient | 94.3 | 17.09 | 95.3 | 20.01 | 85.4 | 15.33 | 102.9 | 13.43 |

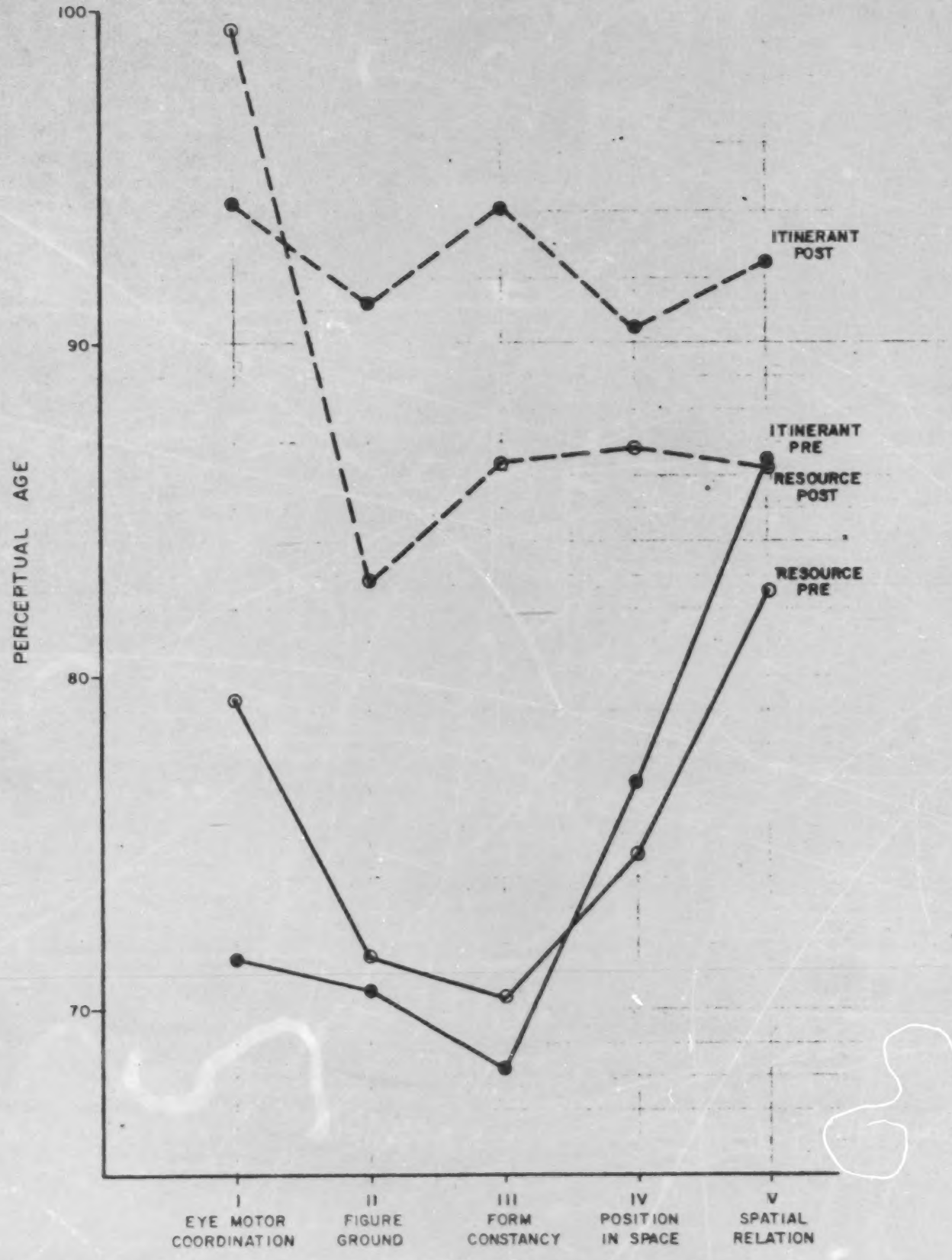
TABLE 11

t-Tests for Mean Differences between Pretreatment and Posttreatment Data

On Frostig Test of Visual Perception for Resource Room and Itinerant Matched Groups

| Subtests | Pre-Resource vs. Pre-Itinerant | | Pre-Resource vs. Post-Resource | | Pre-Itinerant vs. Post-Itinerant | |
|---|---|---|---|---|---|---|
| | t Values (df = 29) | | | | | |
| | d | t values | Gain | t values | Gain | t values |
| Eye-Motor Coordination | 7.7 | 1.37 | 20.0 | 2.13* | 22.6 | 4.56** |
| Figure Ground | 1.1 | 1.89 | 11.2 | 1.28 | 26.0 | 5.00** |
| Form Constancy | 2.1 | .27 | 16.0 | 1.47 | 25.9 | 4.41** |
| Position in Space | 2.1 | .41 | 12.2 | 1.69 | 13.6 | 3.10** |
| Spatial Relations | 3.8 | .78 | 3.7 | .51 | 6.1 | 1.78 |
| Perceptual Quotient | 8.8 | 1.57 | 1.0 | .11 | 17.5 | 4.53** |

* $p < .05$
** $p < .01$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80
70
PERCEPTUAL AGE
ITINERANT POST
ITINERANT PRE
RESOURCE POST
RESOURCE PRE
I EYE MOTOR COORDINATION
II FIGURE GROUND
III FORM CONSTANCY
IV POSITION IN SPACE
V SPATIAL RELATION
FROSTIG TESTS

Figure 2

TABLE 12

Means and Standard Deviations of Age Scores on the Visual Motor Integration Test for Resource and Itinerant Matched Groups

| Resource | | | | Itinerant | | | |
|---|---|---|---|---|---|---|---|
| Pre | | Post | | Pre | | Post | |
| Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| 74.6 | 15.75 | 93.8 | 27.23 | 78.1 | 22.15 | 94.5 | 28.95 |

TABLE 13

t-Tests for Mean Differences between Pretreatment and Posttreatment Data on the Visual Motor Integration Test

| Pre-Resource vs. Pre-Itinerant | | Pre-Resource vs. Post-Resource | | Pre-Itinerant vs. Post-Itinerant | |
|---|---|---|---|---|---|
| d | t values | Gain | t values | Gain | t values |
| 3.5 | .59 | 19.2 | 2.50* | 16.4 | 2.39* |

* $p < .05$

The mean gain for the resource room subjects was 19.2 months, and 16.4 months for the itinerant group. Both of these gains were statistically significant paralleling the number of months of remediation in each group.

The results clearly indicated that both groups at both the pre and posttreatment testing performed in a similar way, and both groups gained on the average significantly.

4. Iowa Tests of Basic Skills. In addition to improvement in the basic psychological correlates of learning, it is important to measure improvement in academic achievement.

Most of the paper and pencil tests measuring school achievement are primarily geared to second grade or higher. In District 54 the testing program includes the administration of the Iowa Tests of Basic Skills beginning at the third grade level. Since Iowa Tests are given only at or above the third grade, only scores for the 13 subjects of the third grade at the beginning of remediation are available. The small number of subjects would cast some question on the validity of these findings. Achievement scores were secured on nine subtests: vocabulary, reading, spelling, usage, total language, computation, arithmetic problem solving, total mathematics, and the composite score.

Means and standard deviations for the Iowa subtests for the matched resource and itinerant subjects are presented in Table 14. Mean differences between pretreatment and posttreatment grade placement scores along with t values for significant differences on the two conditions and the two groups are presented in Table 15.

Inspection of the means for the two matched groups suggested that the resource room children consistently performed better than the itinerant group at both pre- and posttreatment testing. However, these differences are not significant except in one subtest. The mean gains for the resource group ranged from 1.0 years to 1.9 years, and from 1.0 to 1.3 for the itinerant group. The mean gains for both groups reached statistical significance. However, when compared with the number of months of remediation for each group, even a gain of 1.4 years in 2.1 years for the resource subjects is not encouraging.

The results suggested that the groups performed relatively equally on the pretreatment and posttreatment testing, and both groups improved significantly, although at a rate that continued to lag behind normal achievement gains.

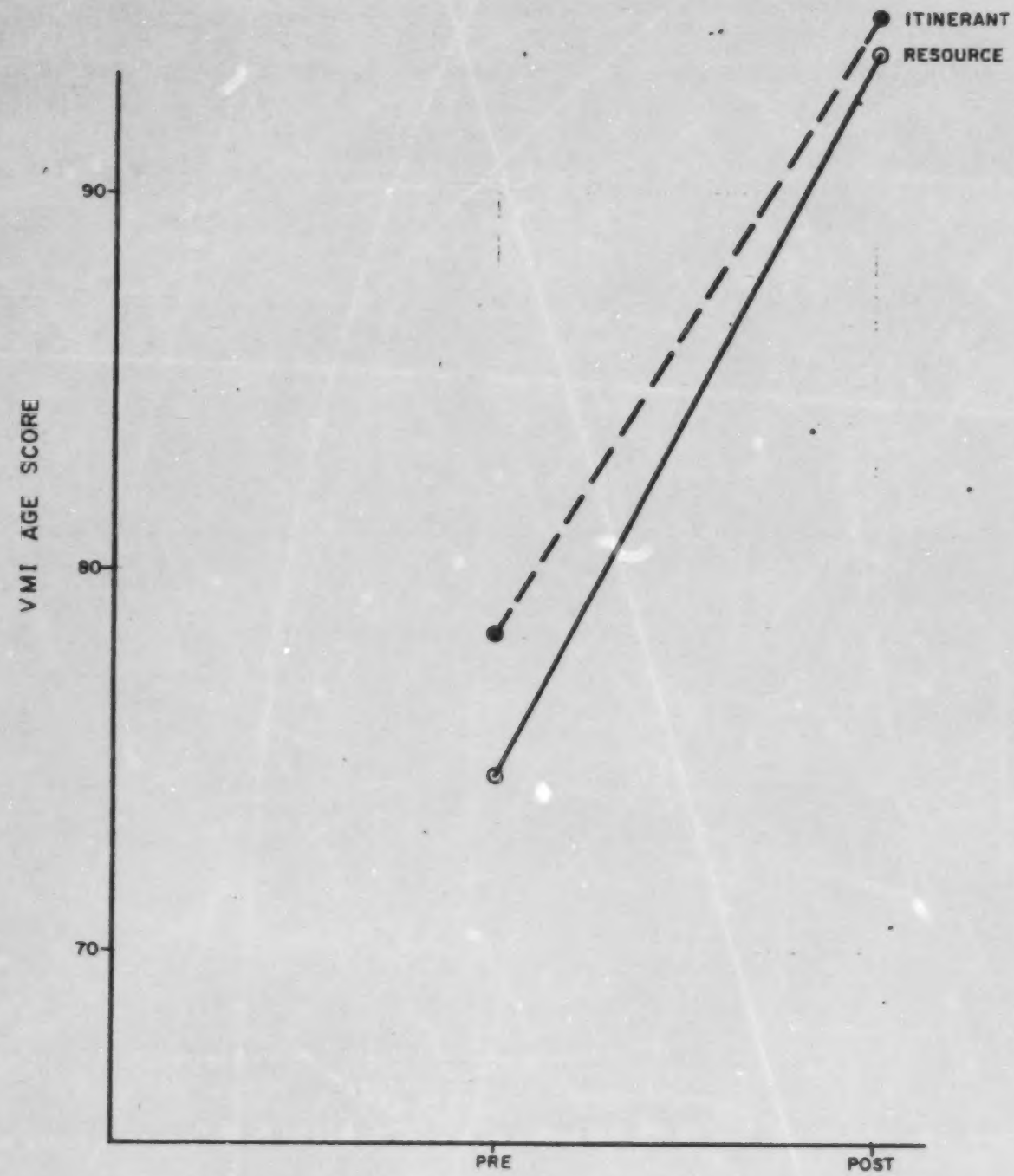



Figure 3

TABLE 14

Means and Standard Deviations of Grade Placement Scores on the Iowa Test of Basic Skills for the Resource and Itinerant Matched Groups

| | Resource | | | | Itinerant | | | |
|---|---|---|---|---|---|---|---|---|
| | Pre | | Post | | Pre | | Post | |
| Subtests | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| Vocabulary | 2.7 | 1.09 | 4.6 | 1.45 | 2.1 | .74 | 3.4 | 1.01 |
| Reading | 3.1 | .76 | 4.2 | 1.37 | 2.5 | .88 | 3.5 | 1.01 |
| Spelling | 2.6 | .93 | 4.1 | 1.39 | 2.0 | .89 | 3.3 | .87 |
| Usage | 2.8 | .88 | 3.8 | 1.01 | 2.0 | .58 | 3.1 | .95 |
| Total Language | 2.7 | .88 | 3.9 | 1.08 | 2.2 | .84 | 3.2 | .77 |
| Computation | 3.1 | .95 | 4.0 | 1.04 | 2.4 | 1.07 | 3.5 | 1.01 |
| Problem Solving | 2.7 | .81 | 4.3 | 1.49 | 2.7 | 1.25 | 4.0 | 1.44 |
| Total Mathematics | 2.9 | .78 | 4.2 | 1.18 | 2.5 | 1.13 | 3.8 | 1.17 |
| Composite Score | 2.8 | .84 | 4.2 | 1.10 | 2.3 | .94 | 3.5 | .91 |

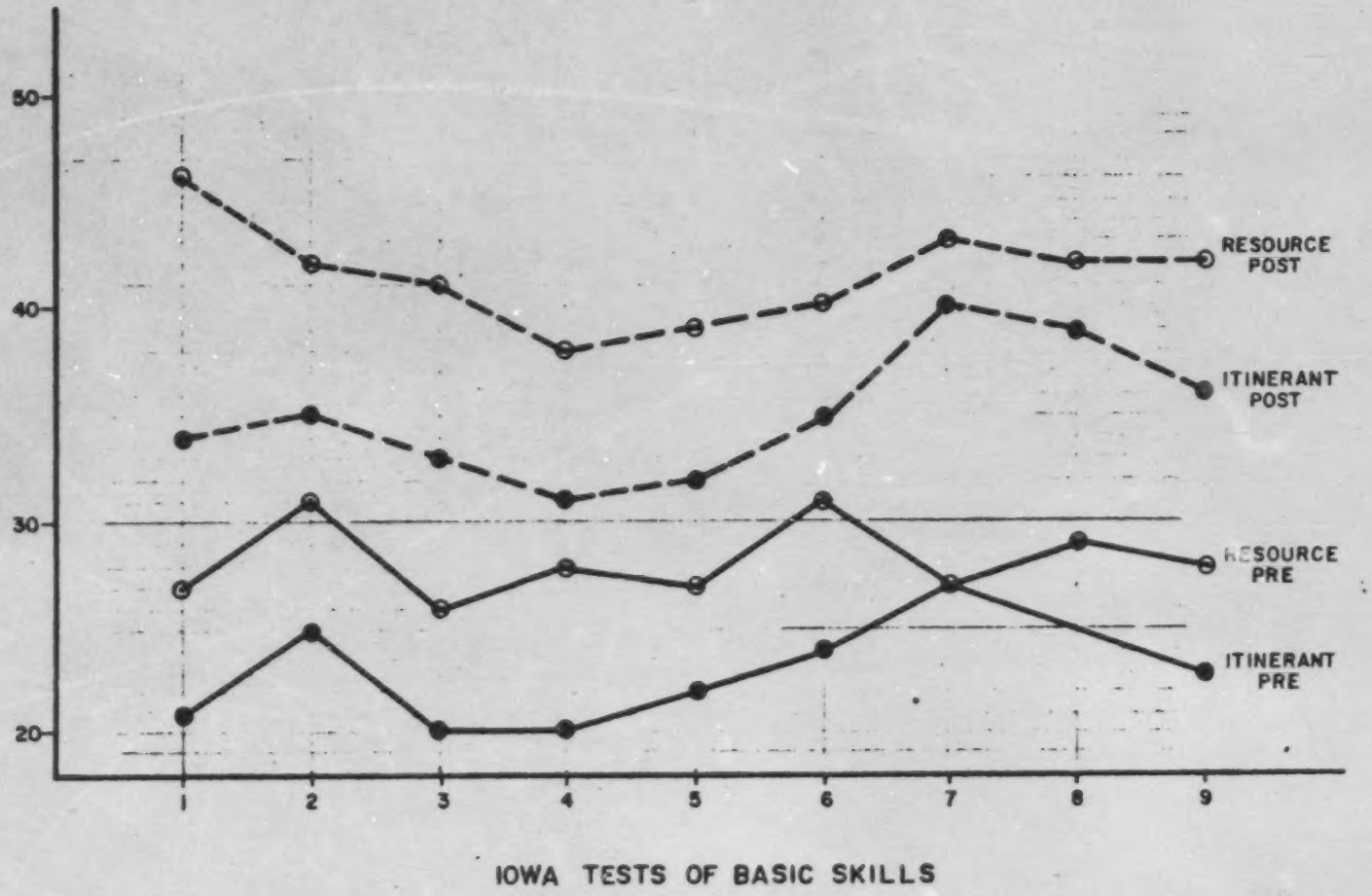
TABLE 15

t-Tests for Mean Differences between Pretreatment and Posttreatment Grade Placement Scores on the Iowa Tests of Basic Skills for the Resource Room and Itinerant Matched Groups

(df = 12)

| Subtests | Pre-Resource vs. Pre-Itinerant | | Pre-Resource vs. Post-Resource | | Pre-Itinerant vs. Post-Itinerant | |
|---|---|---|---|---|---|---|
| | d | t values | Gain | t values | Gain | t values |
| Vocabulary | .6 | 1.55 | 1.9 | 3.59** | 1.3 | 3.34** |
| Reading | .6 | 1.82 | 1.1 | 2.50* | 1.0 | 2.35* |
| Spelling | .6 | 1.54 | 1.5 | 3.07** | 1.2 | 3.13** |
| Usage | .8 | 2.38* | 1.1 | 2.69* | 1.1 | 3.15** |
| Total Language | .4 | .99 | 1.3 | 3.24** | 1.0 | 2.85* |
| Computation | .6 | 1.54 | 1.0 | 2.31* | 1.1 | 2.34* |
| Problem Solving | .9 | .20 | 1.5 | 3.15** | 1.3 | 2.14 |
| Total Mathematics | .4 | .89 | 1.3 | 3.09** | 1.2 | 2.38* |
| Composite Score | .5 | 1.25 | 1.4 | 3.58** | 1.2 | 2.89* |

* $p < .01$
** $p < .05$




Grade Scores
Figure 4

Discussion

The basic question to which this chapter is addressed is: Can children with specific learning disabilities be served as effectively with the combined diagnostic-remedial-consultative program in their own schools as they can by being bussed to another school for the resource room program? Of equal importance is the question: Can significant changes be effected in these children with either of the special programs?

The findings suggest that the two programs are equally effective in most areas of measured psycholinguistic abilities, visual perception, visual-motor integration, and language and arithmetic achievement skills. The groups did not differ significantly when they started, although the itinerant group scored higher on most variables. Post-treatment differences between the two groups were significant on only four variables, all in favor of the itinerant group. On most of the abilities measured, the programs appeared to be equally effective for both groups.

Turning to the efficacy of the programs, to the gains within each group, it is apparent that an increase in all areas was accelerated for both groups. In general, this increase was greater for the itinerant group than for the resource group. Gain scores for the itinerant group reached statistical significance, while the gains for the resource group did not. The lack of the significance between the groups after remediation appears to be an artifact of the statistics involved rather than a lack of change in the means of the groups. The large variances in the data reduced the significance of the change in the means.

Although the two groups did not differ significanly on most variables in the post-remediation data, the greater gains of the itinerant group in most areas are of interest. It is apparent that the rationale for the finding of greater gains for the itinerant group than for the resource group cannot be found in differences in teaching methods, or in the skills of the teachers. Similar methods and materials were used for both groups, and the training and experience of the learning disability teachers appeared to be equivalent. It would seem feasible that the removal of the child from the school in which he "belongs" would create problems in the new school which would interfere with the efficacy of the special program. These problems seem to involve the self-perception of the child, his peer relationships both at home and at school, and the possibly negative attitudes of the regular classroom teacher in the new school who knows the child "does not belong here." The most important of these seems to be teacher expectancy. Since both the resource room program and the itinerant program involved placement in a regular classroom, and parttime placement in the special class, the attitude

and expectancy of the regular class teacher was critical to the success of the program. It is possible that the teacher in the building normally attended by the child was more accepting of deviant children who "belong" in the building than the teachers in the building to which the child was bussed. The adjustment to the new school may also have been critical to the child's rate of remediation. The emphasis in the itinerant program on the involvement of the regular class teacher may also have been a reason for the differences in gain scores.

## Conclusion

Since learning disability programs are relatively new, there have been no previous studies which have compared similar organizational plans, i.e., resource vs. itinerant. The primary concern of educators at the moment is with the efficacy of any special program for the child with a specific learning disability. The results of this study indicate that gains can be effected in psycholinguistic abilities, visual perception, visual-motor integration, and achievement by both special programs. They suggest that the preferred method of providing service to the children is by means of an itinerant teacher.

In terms of the numbers of children served, the gains in basic psycholinguistic processes and school achievement, plus the expense, time, and inconvenience, it is concluded that the itinerant program could be more desirable in districts of comparable size and proximity of schools.

Since the resource room did not show superiority to the itinerant program, but rather some inferiority, it would appear that an itinerant program is preferable. This conclusion is reached because an itinerant program is easier to administer, does not require bussing of children to schools containing resource rooms, and possibly because greater responsibility is placed on the regular school program.

## Chapter IV

## Characteristics of the Population

As the field of learning disabilities has begun to mature professionally, it has become apparent that many of the difficulties in the field are the direct result of the heterogeneity of the population. It can be hypothesized that this heterogeneity may stem from the multiple etiological factors involved and/or from the combinations of process problems which may underlie the aberrations in learning seen in the child. Undoubtedly, some of the heterogeneity is due to confusion surrounding the operationalizing of the definition of learning disabilities. Many students now labelled learning disabled could more precisely be described as children with learning problems associated with below average intelligence, poor teaching, lack of motivation, mobility, etc.

Extensive reviews of the research literature dealing with characteristics of the population and with the efficacy of remediation programs yield conflicting or confusing results. These conflicting results may be a function of the diverse populations or of the unique subgroups of the heterogeneous population included in each study. The conflicting results have been a function of the fact that different subpopulations were involved. The results may be applicable only to a limited undefined segment of the total learning disabilities population. Even after a very careful selection of only those research efforts which meet stringent criteria of scientific standards of research, the lack of statistical or educational significance between populations studied makes conclusions difficult to draw. If research is to be useful for educational planning, the types of children studied must be conceptually comparable to those recognized by educational specialists as the unique target population of learning disabled students.

The problem in deriving replicable research knowledge appears to stem from the difficulties in delineating subgroups within the total population. The urgent question which needs resolution is:

> Are there clusters of abilities and disabilities which accurately characterize subgroups within the total population? What are the psychoeducational dimensions of these subgroups? If more homogeneous clusters can be isolated, can the nature of these component disabilities be further investigated?

If answers to these questions can be derived from the data, it may be possible to predict which remedial methods and materials might be effective for each subgroup. Until individual differences between subgroups can be defined, the most accurate statement that can be made about most methods and materials is that they work for some children and do not work for others.

In an effort to delineate clusters of disabilities and abilities within the sample, the data from WISC's, WPPSI's, Stanford-Binets, ITPA's and Frostig Tests of Visual Perception were processed in several different ways:

1. The Matching Profile program, using Cohn's recommendation, a coefficient of profile similarity;
2. A step-wise factor analysis;
3. Discriminate Analysis;
4. Veldman's adaptation of Ward's Hierarchial Grouping.

The first three procedures were inappropriate and inconsequential due to methodological problems involving characteristics of the data, number of cases, etc.

In the case of the Matching Profile program, it was determined that the number of cases was insufficient. Although this technique was not feasible to use in this study, it would seem to be a useful approach for the researcher who has a large number of cases profiled. Emphasis is placed on the test score rather than on the normative aspects of individual test scores.

A principal axis factor analysis using $R^2$ on the diagnosis was also accomplished. The factors were rotated to obtain an orthogonal simple structure. This analysis did not yield results which could be meaningfully interpreted and empirically verified. Unique factorially defined disabilities may not exist. Instead, a profile of strengths and weaknesses may characterize subgroups of learning disabled children. Thus, this factorial analysis approach to the data was not pursued further.

In a further attempt to determine if discrete disability patterns were present in the children, several profile analyses were run on various combinations of their test scores and other relevant data. The technique of profile analysis found most applicable to these data was Donale J. Veldman's (1967) adaption of Ward's Hierarchical Grouping (1963). "The purpose of the program is to compare a series of profiles (over a series of variables), and to progressively associate them into groupings in such a way as to minimize an overall estimate of variation within clusters" (Veldman, 1967). In other words, the purpose of the program is to identify groups of clusters of profiles that are made up by combining maximally similar elements, so that the differences between two or more profiles in a given group would be as small as possible.

The Hierarchical Grouping program works on the absolute distances between profiles, found by summing the squared differences between corresponding scores in the profiles and dividing by the number of profiles being examined. Thus, starting with 68 profiles, the Hierarchical Grouping program, in step-wise fashion, combined the closest two profiles and subsequently the most similar profiles until it arrived at a single group of profiles containing all of the original data. At each step along the

way, the program computes the amount of error made by combining each successive most similar profile into the group. This error index is the previously mentioned sum of the squared differences between the corresponding elements in the profiles divided by the number of profiles being compared. In the initial combinations of profiles this error term was relatively small, but as the grouping process continued it became larger, in this case from 2.83 to 54.42 over 63 levels and then it jumped to 100.29 when another profile was added. This large increase in the error term indicated that a dissimilar profile had been added, and that profiles combined up to that time were in fact the most homogeneous grouping of the profile.

Although the method seems suitable for this population of subjects, it provides no statistical basis for inferring the stability of results to other samples. It is primarily descriptive of the data in a particular sample.

In this way it was determined that the subjects clustered most accurately into four groups as presented in Figure 5.

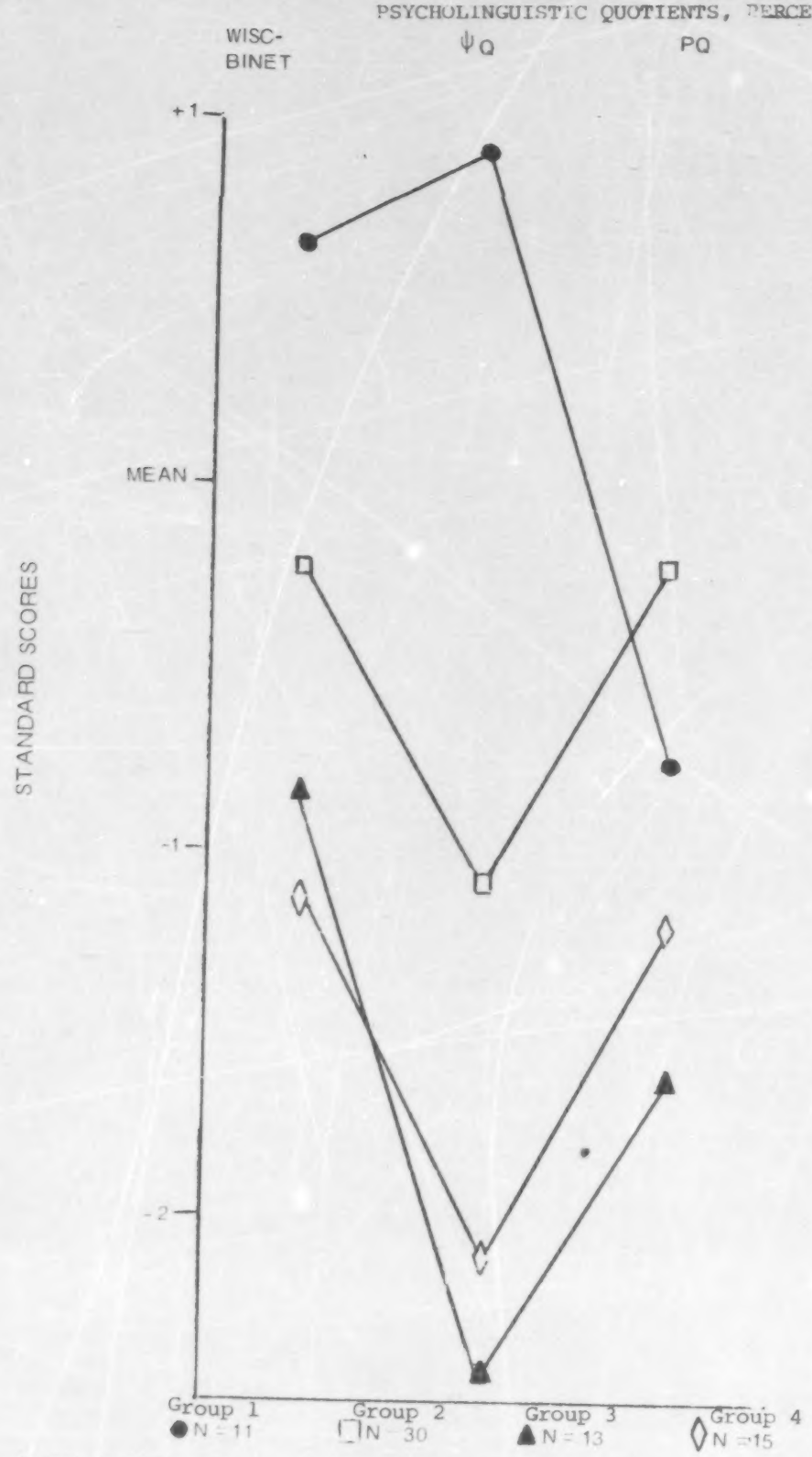
Group 1, consisting of 11 subjects, 10 males, 1 female;
Group 2, consisting of 30 subjects, 28 males, 2 females;
Group 3, consisting of 13 subjects, all males;
Group 4, consisting of 15 subjects, all females.

The profiles of the four groups on WPPSI/WISC/Binet Intelligence Quotients, ITPA Psycholinguistic Quotients, and Frostig Perceptual Quotients are presented in Figure 5. Because of the variability of the means and the standard deviations among the four tests, the absolute scores were converted to profiles of standard deviations in order to make them comparable. It is interesting to note the profile similarity in the lower three groups, (2,3,4,) with the all-female group similar to the other two groups composed primarily of males. There does not appear to be patterns of disabilities characteristic of either boys or girls. One group (group 1) composed of 10 boys and one girl differs completely from the other three groups both in level and shape of the profile.

The mean chronological age of groups 1, 3, and 4 was 6-7; the mean age of group 2 was 7-7. The full year's difference in chronological age in this group did not appear to alter the characteristics of the profile of the group. Since quotients were used in this analysis, level differences were not reflected as they would have been if age scores had been used.

The similarity in profile shape in Groups 2, 3, and 4 is particularly notable. Among the 58 subjects with IQ's below the mean (96.2, 83.3, 87.9) the language deficit as measured by the ITPA is severe. Group 2 is below the mean of the ITPA. Group 3 is more than 2 standard deviations beow the mean, and Group 4 is almost 2.5 standard deviations below the mean on the ITPA. In Group 2, for example, the IQ's fall at the 45th per-

COMPOSITE SCORES on INTELLIGENCE QUOTIENTS,
PSYCHOLINGUISTIC QUOTIENTS, PERCEPTUAL QUOTIENTS




NOTE: SD WISC = 15 SD BINET = 16 SD ITPA = 9.1 SD FROSTIG = 16
WHEREAS IQ SCORES WERE 76% WISC AND 24% BINET. THE SD WAS TAKEN TO BE 15.
SD FOR ψQ WAS TAKEN TO BE THE AVERAGE SD FOR THE FOUR AGE GROUPS AS
REPORTED BY PARASKEVOPOULOS AND KIRK (1969)

FIGURE 5

centile, but linguistic abilities are below the 15th percentile. It would appear that language heavily weights the lowered IQ scores for these groups. They appear to be gradations of linguistic deficits.

In Group 2 the only significant deficit in the profile is in linguistic skills. Both IQ and perceptual quotients are modal. The same is true of Group 3; there are no suggestions of perceptual problems in these two groups. Perceptual skills are appropriate for general skills. In all three groups scoring below the mean in IQ, the major deficit appears to be in language skills, not in perceptual skills.

It is apparent that Group 1 differs sharply from the other three groups. The subjects in this group scored above the mean on both the IQ measure and on the ITPA, but almost one standard deviation below the mean on the perceptual measure. In cognitive and linguistic abilities they fell to the 20th percentile. This would appear to be strong evidence that a normatively severe perceptual problem may be sufficient to cause a great deal of difficulty in school, in spite of above-average intelligence and adequate language development. It should be recalled, that all children in their sample were identified as having specific learning disabilities. In attending to differences between the males and the females (Groups 3 and 4), it would appear that the girls who have language problems may not be as diverse a group as boys with similar language problems.

More detailed information on the types of language deficits present in these subjects is presented in Figure 6. The largest group (N=48) is Group 2 whose scores on all ITPA subscores except auditory decoding fall below the mean. This group shows specific deficits in the Association Process. They appear to be a group of slow-learners with Association Process deficits.

The second largest group (N=39) is Group 1, whose scores on the ITPA are all above the mean except for visual and auditory sequencing. These appear to be above average IQ subjects with deficits at the automatic-sequential or perceptual level. They appear to be bright "leaky buckets."

The past group appears to contain the subjects with the most severe learning disabilities characterized by ITPA scores more than one standard deviation below the mean, except in visual decoding which is .5 standard deviations below. There are wide discrepancies between subscores ranging from a low scaled score of -2.45 on auditory-vocal association to -.47 on visual decoding, a range of almost 2 standard deviations. This group is characterized by a severe auditory channel deficit.

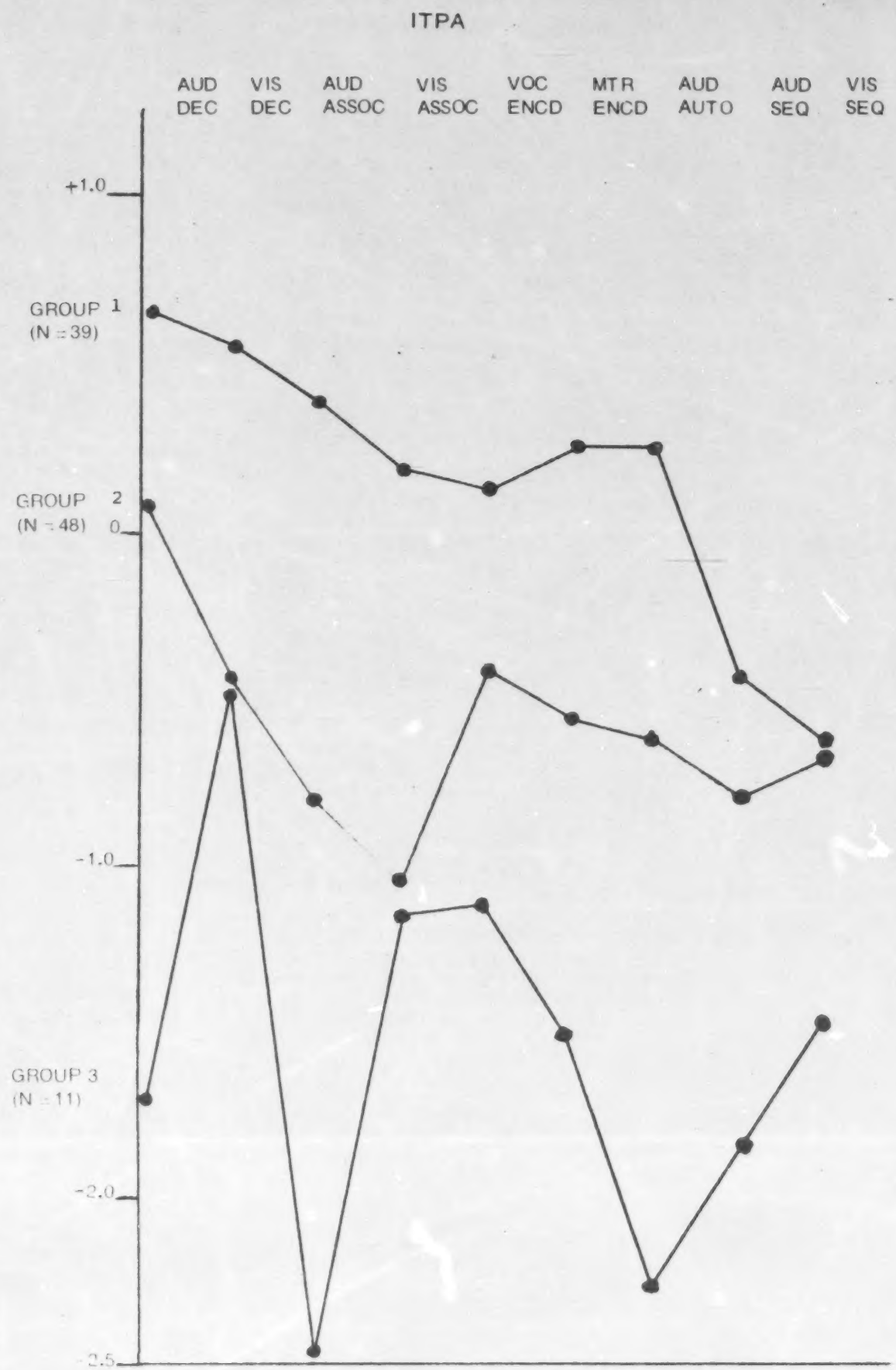

ITPA
AUD DEC
VIS DEC
AUD ASSOC
VIS ASSOC
VOC ENCD
MTR ENCD
AUD AUTO
AUD SEQ
VIS SEQ
+1.0
GROUP 1
(N = 39)
GROUP 2
(N = 48)
0
-1.0
GROUP 3
(N = 11)
-2.0
-2.5



FIGURE 6

Summary

Ward's Hierarchical Grouping technique appears to be a most suitable technique for identifying subgroups within the total learning disability population. It clusters subjects on a dimension attended to by the practitioner, i.e. elevation of scores. High scores and low scores mean something at an absolute level. It is a clinical approach to the data which can be used with no restrictions imposed by the size of the standard deviation. It does not obscure differences as do many parametric approaches.

There appear to be four subgroups within the population. Three of these subgroups are characterized by below average intellectual and perceptual functioning and severe language deficits. The language deficit appears to depress intellectual functioning in all three groups. Since perceptual functioning was at the same level as general intellectual functioning, there did not appear to be a perceptual deficit in these groups. In only one group did a perceptual deficit appear to be significant. This was the group characterized by above average general intellectual and linguistic functioning with a severe visual perceptual deficit.

In seeking additional information about the nature of the linguistic deficit, three clusters were identified using ITPA subscores as the data. The largest group appears to be made up of slow learners with association process deficits. The second group is made up of bright subjects with sequencing deficits at the automatic-sequential or perceptual level. The third group was characterized by below average linguistic functioning with extreme discrepancies among the subtests and severe deficits in the auditory process.

These groups appear to have relevance for educational planning. The group composed of bright subjects with adequate linguistic skills, but deficits in perceptual skills, might benefit from visual perceptual training as an adjunct to an individualized academic program which capitalizes on the above average intellectual and linguistic abilities. The training should address itself to the many functions at the automatic-sequential or perceptual level, including memory, discrimination, closure, figure-ground, form constancy, spatial orientation, etc. In this way, the trainability of some of these functions may be substantiated by further research.

For two of the other three groups, perceptual training does not seem to be indicated, since the scores of the perceptual and intellectual tests are modal. The major deficit in all three groups is in linguistic functioning which would indicate that emphasis would need to be placed on language development. For the largest group of subjects with deficits on the ITPA, the most severe problem is in the association process. Educational programming would need to include activities to encourage concept development, classification and generalization skills in both the auditory and visual channels.

The lowest group of most severe language deficits exhibit deficits in

the auditory channel. Remediation would need to be directed at the problems in auditory decoding, auditory-vocal association, and auditory-vocal automatic functions. A multisensory approach to learning may enhance intersensory transfer.

If the results of this study are replicated with similar findings, the field of learning disabilities may be able to gather empirical data and build a research base which would apply to the subgroups within this extremely heterogeneous population and resolve much of the confusion which now permeates the field.

CHAPTER V

Psychoeducational Characteristics of Children

In Developmental First Grade Classes

Indroduction

The focus on children with specific learning disabilities engendered by the research and demonstration project in Schaumburg District 54 led quite naturally to a concern with early identification and a program of prevention. This chapter will describe a derivative of the learning disabilities project, the developmental first grade program, and will include the philosophy of early education, the selection process, the treatment plan, the cognitive and perceptual characteristics of children selected as being not ready for first grade, and the effects of the treatment plan on these cognitive and perceptual processes.

One of the most common, and yet most questionable practices in education is the practice of placing children who are not ready to succeed in an academic program in first grade. The other alternatives, of repeating kindergarten, or remaining out of school until readiness for success in first grade develops, are equally unsound and lack a base in either research or theory.

Although readiness, especially for reading and academic learning has been a controversial subject, current thinking accepts the fact that maturation unfolds in continuous interactions with environmental stimulation. If this is true, the educator cannot afford to wait passively for maturation to occur, especially in those children who have not responded in a normal way to their preschool and kindergarten environments. Nor should the child be exposed to a kind of instruction that is clearly inappropriate to his particular stage of growth. It becomes incumbent upon the schools to match teaching methods to the child's specific developmental needs.

To admit very immature youngsters into first grade, where their chances to succeed are slim, and where, at the very beginning of their school careers, they are exposed to the damaging experience of failure, is highly undesirable. The psychological stresses experienced by children who are not ready for the educational demands of first grade have been described by many researchers. Allowing non-ready children to enter first grade, in the belief that they will outgrow their difficulties, is a procedure fraught with hazards. Immature first graders do not necessarily catch up, but instead they tend to fall further behind (Olson, 1944).

Immature children's developmental timing is usually atypical. Gallagher (1966) has suggested that developmental imbalances may account for learning disabilities in young children. At kindergarten age they may be unable to benefit from a normal reading readiness program. Repeating kindergarten would give them an additional year in which to mature, and might thus have certain advantages, but it would not provide the intensive and specific training they need. Promotion into first grade, on the other hand, would not solve their problem either, since the pace in first grade is usually too fast for those youngsters who are ready to learn, but are as yet unable to cope with organized reading and writing instruction at the conventional age.

As a direct result of four years of experience with children with special learning disabilities in Schaumburg District 54, it became apparent that non-ready children do not need a reduced program such as they would receive if they repeated kindergarten. They are desperately in need of an intensified program if they are to overcome the disabilities which have already impeded their academic progress.

Such an intensified program, involving identification of children with learning problems at the kindergarten level, and specific remediation the following year, was provided in the developmental first grade program in Schaumburg Elementary District 54.

In the spring of 1967, 60 children were selected who met the criteria for admission to the new classes. The treatment plan proposed as part of this program consisted of three variables: reduced class size, with 15 children per teacher; careful teacher selection; and a specially modified curriculum, with heavy emphasis on language development.

It was administratively and financially feasible to cut normal first grade enrollment in half because the developmental first grade program met the criteria established by the Office of the Superintendent of Public Instruction for Socially Maladjusted Classes, Section 7.01A of the Illinois School Code. This section defines the socially maladjusted as children with "poor social adjustment associated with such factors as cultural deprivation, educational retardation, population mobility, socio-economic considerations, and inadequate school opportunities." The children were considered to be educationally retarded. The State Office reimbursed the school district at the rate of $4,000 per professional worker.

The possible outcomes that were foreseen ranged from extremely optimistic to extremely pessimistic:

1. Immediate placement in a regular first grade for those children who, in September, did not seem to need such a program. It was anticipated that some children would change dramatically over the summer, or that the screening process would have identified some children who seemed not to need the special program.

2. Placement in a regular first grade during the year, if success with the normal academic curriculum could reasonably be predicted.

3. Promotion to a regular second grade the following year, if the problem areas could be sufficiently remediated in the developmental first grade.

4. Placement in a regular first grade next year, where success rather than failure could be predicted. Thus, for those children who could be expected to repeat first grade, the two years of success would replace the usual one year of failure followed by one year of dubious success.

5. Special class placement in one of the existing programs for children with special learning disabilities.

Objectives

This chapter has four specific objectives:

1. To describe a method for screening kindergarten populations to identify high-risk children;

2. To examine and describe the patterns of psycholinguistic development found in children judged as being not ready to succeed in the regular first grade program;

3. To outline an approach to treatment;

4. To evaluate the effects of the program.

Selection Criteria

Because of the numbers of children involved in the kindergarten program (1,200), and the limited special education staff available, it was necessary to utiiize screening devices which could be used by classroom teachers, with a minimal amount of involvement of psychologists, social workers, or psychoeducational diagnosticians. A five-step screening procedure was devised which provided samples of four kinds of behavior:

1. A measure of the child's behavior in a group situation over an extended period of time;

2. A measure of the child's behavior in a one-to-one situation;

3. A measure of the child's ability to function on a paper-and-pencil task;

4. A measure of speech and language development.

The fifth step involved a full staff conference in which all variables, including other alternatives to special class placement, could be weighed.

Using this procedure, those children judged by their teachers to be not ready to succeed in an academic first grade program were placed in one of four developmental first grades.

A carefully designed time table was followed for the screening of 1,200 kindergarten children. At the initial orientation meeting, the program was described in detail, and copies of the Teacher Estimate were distributed to each teacher, along with the "Guidelines for Estimating Pupils Abilities" (Kirk, 1966) (Appendix A). This one-page instrument was filled out for all students about whom the kindergarten teacher had some question about their ability to succeed in first grade. These rating scales were graded by the psychoeducational diagnosticians, and the scores adjusted for chronological age differences.

Those children who scored below 40 were then tested individually by their kindergarten teacher, using a modification of the Behavior and Development Screening Scale (Haring and Ridgeway, 1967) (Appendix B). This test samples the child's performance on a variety of tasks, including speech, language, auditory discrimination, auditory perception, auditory memory for meaningful and non-meaningful material, visual discrimination, visual-motor integration, laterality, and eye-head coordination. All children scoring below 80 on this scale were considered potential candidates for placement in the class.

The third step in the screening procedure involved the Metropolitan Reading Readiness Test (Hildreth, et.al., 1965) routinely given to all kindergarten children in the spring of the kindergarten year. Only those children scoring below the 20th percentile were considered to be in need of placement in the developmental first grade.

In addition, the Speech Correction Department in District 54 devised a speech and language evaluation which included some items similar to those included in the School Readiness Test (Harper & Row, 1964), an articulation test, and the Peabody Picture Vocabulary Test. The child was seen individually by the speech correctionist who administered this screening scale.

From the group of children considered eligible on these four screening measures, final selection of the 60 children to be placed in the classes was made at a staff conference attended by the principal, kindergarten teacher, special class teacher, the psychologist, the psychoeducational diagnostician, the social worker, the nurse, and the speech correctionist. All available information concerning the child, including the health history, the social history, and reports from other agencies were

considered in the final selection process. With those children who could conceivably adjust to the regular curriculum, the deciding factor in some cases was the availability of a very strong first grade teacher. Those children selected for the special classes met the following criteria in addition to those outlined above:

1. Existence of a problem in adjusting to the demands of the regular curriculum, primarily associated with educational retardation;

2. The presence of at least one of the following characteristics in association with the academic, emotional, and/or social adjustment problems:

   a. Slow social and/or physical maturation;
   b. Poor motivation for attendance or participation in kindergarten program;
   c. Poor communication ability;
   d. Inability to comprehend or follow directions;
   e. Problem with socialization with his peers;
   f. Poor familial-cultural background;
   g. Poor familial relationships and attitudes toward child or school.

3. The ability to profit from and learn in the developmental first grade.

Subjects

Using the above criteria, 60 children, or 5% of the total kindergarten population, were selected for placement in the four special classes. Of the 59 children who were finally placed, 35 were boys and 24 were girls. The mean chronological age was 72.5 months (6.0), with a standard deviation of 3.6 months.

Slightly over 50% of the children were from large families, defined as having four or more children. The majority of the subjects were in the middle of the family constellation, with older and younger siblings close in age. Most of the children were emotionally immature as evidenced by numerous reports of poor inner controls, excessive dependency, short attention spans, and the inability to function in a group situation.

Instrumentation and Evaluation

In order to determine the psycholinguistic characteristics of children judged by their teachers as being not ready to succeed in the regular first grade program, the following instruments were used during the developmental first grade year:

1. The Wechsler Preschool and Primary Scale of Intelligence (WPPSI), an individually administered intelligence test which yields 10 subtest scores as well as a verbal I.Q., a performance I.Q., and a full scale I.Q.;

2. The Illinois Test of Psycholinguistic Abilities, an individually administered diagnostic test of nine areas of psycholinguistic development which yields language ages and a psycholinguistic quotient (PSI-Q) which can be plotted as a diagnostic profile;

3. The Frostig Developmental Test of Visual Perception, a paper-and-pencil measure of five areas of visual perception which yields perceptual ages and a perceptual quotient;

4. The Visual-Motor Integration Test (VMI), a paper-and-pencil form-copying test, which yields a VMI age and a VMI quotient;

5. The Wepman Auditory Discrimination Test, an individually administered test of the child's ability to hear the fine differences between words, which yields a score interpreted as adequate, inadequate, or invalid.

All of these tests were administered at the beginning of the school year to the 59 children in the developmental first grade program. All but the WPPSI were administered at the end of the year and were reported as posttreatment data. Differences between the groups were reported and tested for significance using the t-test, analyses of variance, and "F" tests. Intercorrelations of all variables have been calculated and reported.

Treatment Plan

Of the three elements in the treatment plan (reduced class size, careful teacher selection, and a completely modified curriculum), the most critical variable seemed to be teacher selection. All four teachers had many years of experience at the primary level, ranging from nine to twenty-one years. In addition, all had accumulated many graduate hours of credit, and two had completed their master's degrees in reading. They had the ability to work with young deviant children. By reducing the class size to 15, these master teachers were given the opportunity to function at maximum efficiency, and to develop and implement the curriculum.

During the summer of 1967, the teachers worked with an expanded curriculum committee to develop a modified curriculum. It was decided to incorporate elements from both kindergarten and first grade, and to involve programs specifically designed to develop cognitive, perceptual, language, and motor skills.

The classes were scheduled much like all other first grades in the building, starting at 9:00 A.M. and running until 2:30 P.M., with a half-hour for lunch. The children were picked up by bus and trans-

ported to one of four schools which operated the special classes. At the end of the year, most of the children were transferred back to one of the 15 elementary schools normally attended by the children in the community.

The effectiveness of this type of treatment plan can be determined from the data collected at the beginning and end of the school year. The important question which cannot be answered from this data involves the probable outcome if the children had been placed in a regular class. Would the same results have occurred as did occur in the developmental first grade? The lack of a control group during the first year of the program precluded a definitive answer. For that reason, the program was modified the second year to include both experimental and control groups. The results of this comparison will be presented at a later date. However, the results which are included in this report indicate that significant changes can be effected through the type of treatment plan described here.

Results

The results of this program are discussed under the following headings: 1) General Intellectual Functioning; 2) Psycholinguistic Abilities; 3) Visual Perception; 4) Visual-Motor Integration; and, 5) Auditory Discrimination.

1. General Intellectual Functioning. Table 16 presents the means and standard deviations of scaled scores for each subtest of the Wechsler Preschool and Primary Scale of Intelligence, as well as the verbal, performance, and full scale I.Q.'s. Their intercorrelations are presented in Table 17. Mean scale scores are presented graphically in Figure 7.

An inspection of the means revealed that the performance of the developmental first grade children on the WPPSI was below the average performance of the standardization sample. The average full scale I.Q. was 90, with a verbal I.Q. of 90, and a performance I.Q. of 92.

Analysis of variance results for differences between subtests and subjects scores are presented in Table 18.

Differences between the 10 subtests reached statistical significance ($F_{56/504} = 6.94$; $p < .01$). This significant statistic indicates that the children in the developmental first grade, in terms of general intellectual functioning, constitute a heterogeneous group.

Differences among the 10 WPPSI subtests were statistically significant ($F_{9/504} = 6.71$; $p < .01$). This significant F suggests that the profile of the 10 WPPSI subtests is not flat. Multiple comparisons for mean differences among pairs of subtests indicated that the Arithmetic subtest was significantly ($p < .01$; except Arithmetic vs. Similarities $p < .05$) different from all other subtests except Information, Animal

Table 16

Means and Standard Deviations of WPPSI Scaled Scores,

Verbal IQ, Performance IQ and Full Scale IQ

| WPPSI Subtest | SCALED SCORES Means | S.D. |
|---|---|---|
| Information | 8.4 | 2.26 |
| Vocabulary | 9.1 | 3.14 |
| Arithmetic | 6.9 | 2.34 |
| Similarities | 8.7 | 3.06 |
| Comprehension | 9.0 | 2,89 |
| Animal House | 8.1 | 3.14 |
| Picture Completion | 9.4 | 2,93 |
| Mazes | 9.2 | 2.86 |
| Geometric Design | 9.8 | 3.51 |
| Block Design | 7.7 | 3.01 |
| Verbal IQ | 89.7 | 14.08 |
| Performance IQ | 92.3 | 14.11 |
| Full Scale IQ | 90.0 | 13.75 |

Table 17

Inter Correlations* for ITPA, Frostig, WPPSI, Developmental Form Sequence, and Wepman Auditory Discrimination Scores

for 59 Developmental First Grade Children

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 Aud. Decoding | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 Vi. Decoding | 20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 Aud. Assoc. | 36 | 29 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 Visual Assoc. | 10 | -10 | 32 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 Vocal Encoding | 37 | 17 | 18 | 04 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 Motor Encoding | 28 | 11 | 42 | 12 | 42 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 Aud. Automatic | 39 | 27 | 57 | 15 | 31 | 47 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 Aud. Sequencing | 15 | 17 | 41 | 24 | 27 | 28 | 36 | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 Vis. Sequencing | 05 | 19 | 05 | -01 | -02 | -07 | 03 | 07 | | | | | | | | | | | | | | | | | | | | | | | |
| 10 Total Age | 61 | 29 | 59 | 40 | 35 | 31 | 48 | 36 | 10 | | | | | | | | | | | | | | | | | | | | | | |
| 11 Psycho. Quot. | 57 | 35 | 70 | 34 | 57 | 50 | 66 | 61 | 16 | 91 | | | | | | | | | | | | | | | | | | | | | |
| 12 Eye Motor Coor. | 23 | 07 | 22 | -08 | 00 | 12 | 12 | 30 | -09 | 01 | 18 | | | | | | | | | | | | | | | | | | | | |
| 13 Figure Ground | 12 | 08 | 46 | 23 | 07 | 29 | 34 | 51 | 12 | 36 | 44 | 18 | | | | | | | | | | | | | | | | | | | |
| 14 Form Constancy | 17 | 11 | 09 | 00 | 18 | 06 | 33 | 16 | 01 | 20 | 33 | 04 | 35 | | | | | | | | | | | | | | | | | | |
| 15 Pos. In Space | 17 | 10 | 46 | 07 | 18 | 12 | 29 | 33 | 22 | 33 | 43 | -04 | 35 | 20 | | | | | | | | | | | | | | | | | |
| 16 Spatial Rel. | 26 | 05 | 41 | 17 | 14 | 12 | 25 | 37 | 26 | 33 | 48 | 05 | 48 | 16 | 26 | | | | | | | | | | | | | | | | |
| 17 Perceptual Quot. | 37 | 15 | 38 | 00 | 30 | 12 | 34 | 42 | 07 | 30 | 60 | 29 | 55 | 70 | 44 | 50 | | | | | | | | | | | | | | | |
| 18 Information | 42 | 28 | 55 | 13 | 42 | 27 | 46 | 27 | 08 | 52 | 66 | 21 | 40 | 36 | 39 | 20 | 56 | | | | | | | | | | | | | | |
| 19 Vocabulary | 44 | 15 | 47 | 14 | 34 | 14 | 41 | 22 | 00 | 52 | 55 | 13 | 08 | 29 | 34 | 15 | 34 | 62 | | | | | | | | | | | | | |
| 20 Arithmetic | 34 | 22 | 55 | -04 | 25 | 29 | 34 | 14 | 16 | 35 | 55 | -04 | 29 | 24 | 40 | 52 | 47 | 50 | 62 | | | | | | | | | | | | |
| 21 Similarities | 28 | 33 | 35 | 02 | 19 | 09 | 30 | 32 | 27 | 42 | 59 | 02 | 17 | 36 | 45 | 18 | 36 | 50 | 40 | 57 | | | | | | | | | | | |
| 22 Comprehension | 36 | 14 | 62 | 21 | 21 | 21 | 49 | 24 | 09 | 55 | 63 | 19 | 20 | 35 | 49 | 38 | 51 | 64 | 61 | 52 | 57 | | | | | | | | | | |
| 23 Animal House | 12 | -07 | 27 | 12 | 12 | 14 | 18 | 22 | 34 | 19 | 24 | 18 | 39 | 15 | 36 | 25 | 33 | 24 | 25 | 23 | 42 | 27 | | | | | | | | | |
| 24 Pic. Completion | 29 | 27 | 45 | 05 | 18 | 37 | 50 | 31 | 06 | 37 | 51 | 20 | 29 | 14 | 19 | 49 | 35 | 39 | 36 | 47 | 41 | 44 | 23 | | | | | | | | |
| 25 Mazes | 28 | 17 | 40 | 29 | 27 | 10 | 30 | 37 | 00 | 35 | 53 | 14 | 39 | 19 | 37 | 51 | 46 | 32 | 17 | 46 | 20 | 44 | 11 | 41 | | | | | | | |
| 26 Geo. Design | 31 | 19 | 38 | -03 | 20 | 08 | 36 | 42 | 05 | 29 | 48 | 28 | 44 | 19 | 18 | 54 | 57 | 27 | 17 | 40 | 35 | 31 | 28 | 39 | 50 | | | | | | |
| 27 Block Design | 03 | 13 | 30 | 04 | 08 | 23 | 26 | 30 | 10 | 08 | 37 | 16 | 31 | 16 | 22 | 30 | 34 | 26 | 08 | 24 | 22 | 28 | 14 | 15 | 31 | 38 | | | | | |
| 28 Ver. Scale IQ | 46 | 29 | 63 | 12 | 37 | 26 | 49 | 33 | 16 | 55 | 71 | 14 | 30 | 38 | 52 | 35 | 58 | 80 | 82 | 73 | 82 | 85 | 37 | 53 | 39 | 40 | 29 | | | | |
| 29 Perf. Scale IQ | 29 | 20 | 54 | 13 | 23 | 26 | 47 | 47 | 19 | 36 | 65 | 29 | 55 | 23 | 36 | 62 | 59 | 43 | 31 | 52 | 47 | 51 | 54 | 71 | 64 | 78 | 67 | 58 | | | |
| 30 Full Scale IQ | 42 | 28 | 66 | 14 | 34 | 29 | 55 | 47 | 19 | 54 | 77 | 24 | 47 | 35 | 50 | 54 | 62 | 70 | 66 | 71 | 73 | 79 | 50 | 69 | 58 | 65 | 54 | 90 | 88 | | |
| 31 Dev. Form Seq. | 06 | 14 | 29 | -04 | 17 | 14 | 17 | 34 | 15 | 24 | 31 | 40 | 38 | 09 | 13 | 29 | 34 | 29 | 24 | 40 | 19 | 16 | 11 | 31 | 45 | 43 | 36 | 34 | 45 | 44 | |
| 32 Aud. Discrim. | 27 | 12 | 20 | 04 | 11 | 11 | 15 | -10 | 12 | 27 | 22 | 02 | 11 | 10 | 13 | 21 | 11 | 37 | 23 | 32 | 01 | 26 | -07 | 08 | -03 | -02 | 02 | 26 | -04 | 13 | -2 |

* All numbers have been multiplied by 100

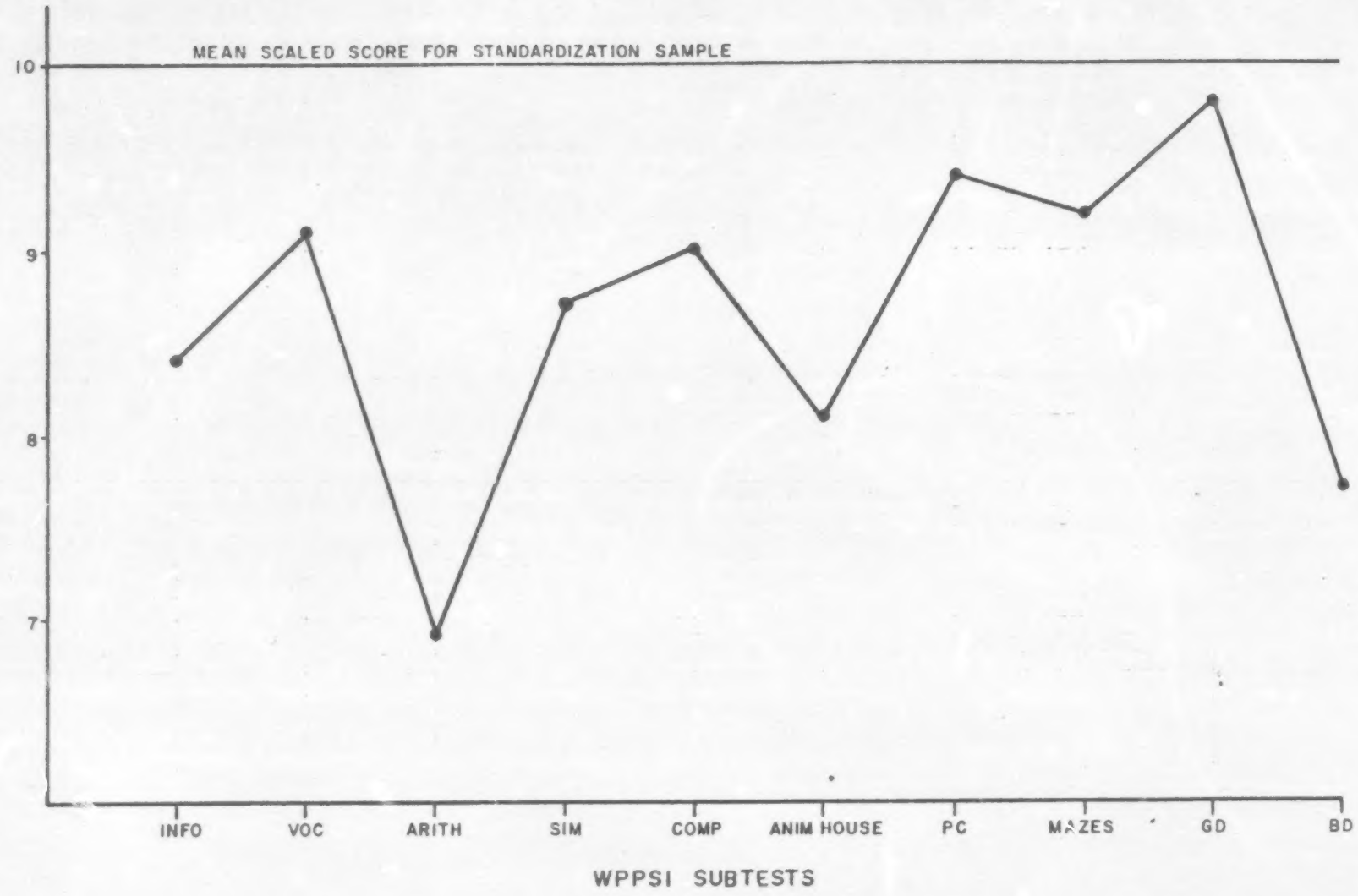

MEAN SCALED SCORE FOR STANDARDIZATION SAMPLE
10
9
8
7
SCALED SCORES
INFO
VOC
ARITH
SIM
COMP
ANIM HOUSE
PC
MAZES
GD
BD
WPPSI SUBTESTS

Figure 7
-63-

Table 18

Analysis of Variance

for the Scaled Scores of the Ten WPPSI Subtests

for 59 Developmental First Grade Children

| Source of Variation | df | MS | F |
|---|---|---|---|
| Subjects | 59 | 38.92 | 6.94* |
| Subtests | 9 | 40.24 | 6.71* |
| Error | 504 | 5.80 | |

* $p < .01$

House, and Block Design. Also, Block Design was significantly different from Geometric Design ($p < .05$).

2. Psycholinguistic Abilities. The means and standard deviations of the language ages for the nine subtests and total language age for the pretreatment and posttreatment data on the Illinois Test of Psycholinguistic Abilities are presented in Table 19. Figure 8 shows graphically these means. The intercorrelations for the pretreatment data are presented in Table 17. A perusal of the ITPA performance indicates that mean language ages for all subtests and total language age scores of the developmental first grade children are below the mean chronological age of the group (72.5 mos.). This discrepancy is reflected in the psycholinguistic quotient of 84.

Analysis of variance of pretreatment data as well as posttreatment data (Table 20) reveals that the mean differences among the subjects averaged over the nine subtests reached statistical significance ($F_{58/464} = 3.54$; $p < .01$). This result indicates that children in the developmental first grade constitute a psycholinguistically heterogeneous group.

The F values for mean differences among the subtests for both the pretreatment and posttreatment data were statistically significant, suggesting that the ITPA subtest profile is not flat at the start of the project, nor is it flat after nine months of treatment.

To examine the nature of the differences among the subtests, mean differences among all possible subtest combinations were tested by means of Scheffe's (1953) method. For the pretreatment data the standard error for the difference was 2.73. The only comparisons which reached significance were Auditory Decoding vs. Vocal Encoding (S value = 12.3, with 8/464 df; $p < .01$), Auditory Decoding vs. Motor Encoding (S value = 14.2; $p < .01$), Visual Decoding vs. Motor Encoding (S value = 11.6; $p < .05$), and Auditory Decoding vs. Auditory Vocal Sequencing (S value = 11.8, $p < .05$).

For the posttreatment data, the standard error for the difference was 2.39. Auditory Sequencing differed significantly from all other subtests ($p < .05$), except from Visual Sequencing ($p < .01$). Mean differences between Auditory Decoding and Visual Sequencing also reached statistical significance ($p < .05$).

The effects of the remediation upon psycholinguistic abilities were assessed by examining gain scores between pretreatment and posttreatment data. In Table 19 are t values for the mean differences between pretreatment and posttreatment data for the total language age and subtest language ages. Table 21 shows t values for the psycholinguistic quotient.

Table 19

Means, Standard Deviations of ITPA Language Ages (in months)

of Pre- and Posttreatment and Gain Scores

for 59 Developmental First Grade Children

| ITPA Tests | Pretreatment Mean | Pretreatment SD | Posttreatment Mean | Posttreatment SD | Mean Gain | t Values (df=57) |
|---|---|---|---|---|---|---|
| Auditory Decoding | 70.6 | 17.52 | 81.3 | 16.91 | 10.7 | 3.33** |
| Visual Decoding | 68.0 | 18.66 | 80.3 | 14.60 | 12.3 | 3.92** |
| Auditory Association | 63.3 | 13.30 | 78.6 | 13.76 | 15.3 | 6.7 ** |
| Visual Association | 66.6 | 14.40 | 79.9 | 14.26 | 13.3 | 4.99** |
| Vocal Encoding | 58.3 | 18.55 | 79.2 | 19.22 | 20.9 | 5.93** |
| Motor Encoding | 56.4 | 17.60 | 74.7 | 21.57 | 18.3 | 4.99** |
| Auditory Automatic | 61.7 | 18.20 | 73.9 | 17.74 | 12.2 | 3.58** |
| Auditory Sequencing | 58.8 | 17.13 | 61.9 | 12.63 | 3.1 | 1.08 |
| Visual Sequencing | 61.2 | 12.83 | 71.2 | 13.35 | 10.0 | 4.07** |
| Total Language Age | 61.5 | 11.74 | 74.8 | 9.96 | 13.3 | 14.30** |

**p < .01

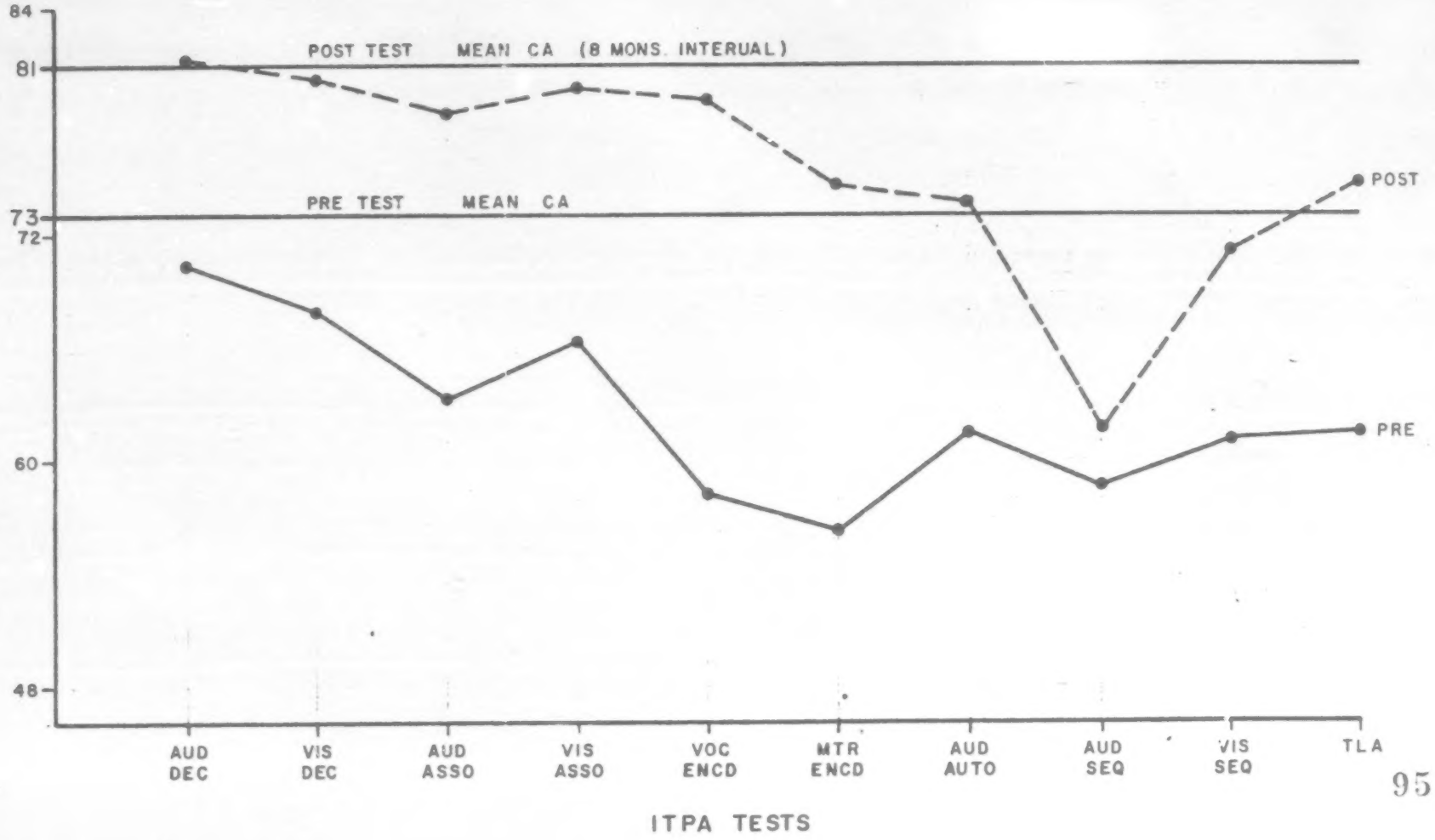

84
81
73
72
60
48
POST TEST MEAN CA (8 MONS. INTERUAL)
PRE TEST MEAN CA
POST
PRE
LANGUAGE AGE
AUD DEC
VIS DEC
AUD ASSO
VIS ASSO
VOC ENCD
MTR ENCD
AUD AUTO
AUD SEQ
VIS SEQ
TLA
ITPA TESTS

Figure 8

Table 20

Analysis of Variance

of ITPA Language Age Scores of the Nine Subtests

for 59 Developmental First Grade Children

| | Pretreatment | | | Posttreatment | | |
|---|---|---|---|---|---|---|
| Source of Variation | df | MS | F | df | MS | F |
| Subjects | 58 | 779.21 | 3.54* | 55 | 922.29 | 5.80* |
| Subtests | 8 | 1364.50 | 6.19* | 8 | 2253.00 | 14.17* |
| Error | 464 | 220.30 | | 440 | 159.05 | |

*$p < .01$

Table 21

Psycholinguistic Quotients, Perceptual Quotients

and Visual Motor-Integration Quotients

for 59 Developmental First Grade Children

| | Pretreatment Mean | SD | Posttreatment Mean | SD | Mean Gain | t Values (df=58) |
|---|---|---|---|---|---|---|
| ITPA Psycholinguistic Quotient | 83.5 | 13.16 | 92.2 | 14.24 | 8.7 | 6.60* |
| Frostig Perceptual Quotient | 84.2 | 11.24 | 93.7 | 12.62 | 9.5 | 6.64* |
| Visual Motor Integration Quotient | 81.8 | 11.47 | 86.6 | 7.05 | 4.7 | 3.95* |

*p .01

Mean gains for psycholinguistic quotients, the total language age, and the subtests, except for Auditory Vocal Sequencing, were statistically significant ($p < .01$). Inspection of the mean gains indicates that the group, in an eight month period, achieved the greatest gain in the encoding process (21 months in Vocal Encoding and 18 months in Motor Encoding) and in the association process (15 months in Auditory Vocal Association, and 13 months in Visual Association). In Auditory Vocal Sequencing, the gain was three months in an eight month period. In the other subtests, the mean gains ranged from 10.0 to 12.3 months. The psycholinguistic quotient, which reflects the rate of psycholinguistic development, increased from 83.5 to 92.2, a gain of approximately nine points.

Contrasting the gains in psycholinguistic abilities with the intervening time, it can be said that the special educational intervention accelerated the rate of psycholinguistic development of the children substantially.

3. Visual Perception. Table 22 presents the means and standard deviations of the age scores for the five subtests of the Frostig Developmental Test of Visual Perception. Figure 9 presents these means graphically. The means and standard deviations for the perceptual quotients are presented in Table 21. The intercorrelations of the subtests and the perceptual quotients are shown in Table 17.

Inspection of the mean ages reveals that at the start of the project the perceptual development of the children averaged more than a year below their chronological age. The perceptual quotient, reflecting the rate of development, was 84 (the expected average rate is 100). Analysis of variance revealed that all five subtests were uniformly low (Table 23).

Analysis of variance for the posttreatment data showed that Eye-Motor Coordination differed significantly ($p < .01$) from the other subtests, except Figure Ground. It was also found that Figure Ground was significantly different from Form Constancy ($p < .05$), Position in Space ($p < .01$), and Spatial Relations ($p < .05$).

The performance averaged over the five subtests was significantly different for the various subjects ($F_{58/232} = 60.12$; $p < .01$). This finding suggests that the children in the developmental first grade are heterogeneous in terms of visual perceptual development.

Evaluation of the changes in perceptual development which occurred during the developmental first grade year was accomplished by comparing the pretreatment scores to the posttreatment scores. Gain scores and t values for significant differences between pretreatment and posttreatment data are presented in Table 22 for subtest age scores, and in Table 21 for perceptual quotients. For an eight month period, the gains on Form Constancy (22.1), Position in Space (20.8), and

Table 22

Means and Standard Deviations of Frostig Age

Equivalents (in months) of Pre and Posttreatment for 59 Developmental First Grade Children

| Frostig Tests | Pretreatment Mean | SD | Posttreatment Mean | SD | Mean Gain | t Values (df=55) |
|---|---|---|---|---|---|---|
| Eye-Motor Coordination | 59.1 | 10.48 | 69.4 | 13.15 | 10.3 | 4.67* |
| Figure Ground | 58.1 | 12.07 | 73.3 | 14.77 | 15.2 | 6.04* |
| Form Constancy | 58.2 | 17.58 | 80.3 | 16.95 | 22.1 | 6.77* |
| Position in Space | 62.2 | 11.72 | 83.0 | 13.71 | 20.8 | 8.93* |
| Spatial Relations | 61.7 | 10.31 | 80.8 | 12.02 | 19.1 | 9.18* |

*$p < .01$

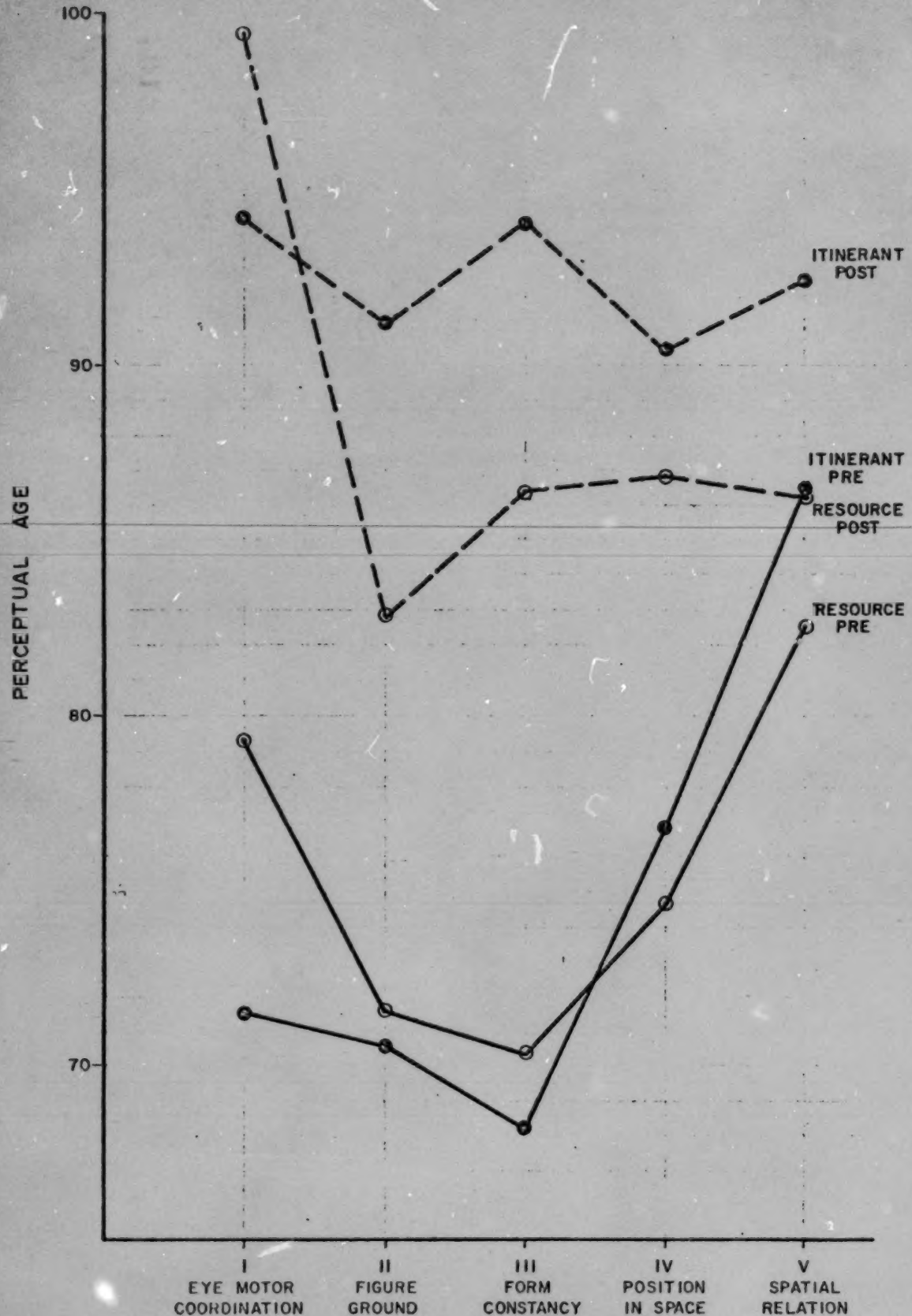

100
90
80
70
PERCEPTUAL AGE
ITINERANT POST
ITINERANT PRE
RESOURCE POST
RESOURCE PRE
I EYE MOTOR COORDINATION
II FIGURE GROUND
III FORM CONSTANCY
IV POSITION IN SPACE
V SPATIAL RELATION
FROSTIG TESTS

Fig. 9

Table 23

Analysis of Variance

for Mean Differences among the Five Frostig Subtests

for 59 Developmental First Grade Children



| Source of Variance | Pretreatment df | MS | F | Posttreatment df | MS | F |
|---|---|---|---|---|---|---|
| Subjects | 58 | 10882.16 | 60.12* | 55 | 463.78 | 5.00* |
| Subtests | 4 | 225.25 | 1.24 | 4 | 1872.08 | 20.33* |
| Error | 232 | 181.02 | | 220 | 92.09 | |

*$p < .01$

Spatial Relations (19.1) were unexpectedly large. The perceptual quotient, reflecting the rate of development, increased by 10 points, from 84 to 94.

It can safely be said, therefore, that the children improved substantially in their level as well as in their rate of perceptual development during the developmental first grade program. The gains in visual perceptual development in most of the subtests were more than twice that which would have been expected. These gains are even more dramatic in view of the slower rate of development during the preschool and kindergarten years.

4. Visual Motor Integration. In the five month interval between pretesting and posttesting, the mean age on the Visual Motor Integration Test increased from 61.4 to 67.2 (Table 24). The mean age gain on visual motor integration was statistically significant ($t = 5.3$; $p < .01$). The visual motor integration mean quotient (Table 21) increased from 82 to 87. The five point mean gain was statistically significant ($t = 3.95$; $p < .01$), suggesting that the rate of development of visual motor integration skills had been accelerated significantly.

5. Auditory Discrimination. Clinical findings and research indicate a close relationship between auditory discrimination abilities and the ability to learn phonics (Ames and Ilg, 1965; de Hirsch, 1966). For this reason, supported by the findings of language deficiencies by the speech correctionists, the Wepman Auditory Discrimination Test was administered.

At the start of the project, 11 children, or 19% exhibited adequate auditory discrimination as measured by Wepman's test (Table 25). The remaining 81% had invalid or inadequate auditory discrimination abilities. After eight months of remediation, 61% of the children had adequate auditory discrimination, and 39% exhibited inadequate or invalid discrimination scores.

Of the 18 children who had invalid auditory discrimination scores during pretreatment testing, six had adequate, eight had inadequate, and four had invalid scores at the time of the posttreatment testing. Of the 28 children with inadequate auditory discrimination abilities at the pretreatment testing, 18 had adequate and 10 had either inadequate or invalid auditory discrimination scores at the end of the project (Table 26).

Table 24

Means, Standard Deviations and the t Value for Pretreatment and Posttreatment Ages on 59 Developmental First Grade Children on the Visual Motor Integration Test

| | Pretreatment | Posttreatment | t values df=58 |
|---|---|---|---|
| Mean | 61.4 | 67.2 | 5.3** |
| SD | 6.51 | 6.53 | |

**p< .01

Table 25

Pretreatment and Posttreatment Performance of 59 Developmental First Grade Children on Wepman's Auditory Discrimination Test

| | Pretreatment | | Posttreatment | |
|---|---|---|---|---|
| | f | % | f | % |
| Invalid | 18 | 32 | 8 | 14 |
| Inadequate | 28 | 49 | 14 | 25 |
| Adequate | 11 | 19 | 35 | 61 |

Table 26

Changes of Performance on Wepman's Auditory Discrimination Test from Pretreatment to Posttreatment for Developmental First Grade Children

| Pretreatment | Posttreatment |
|---|---|
| 18 Invalid | 6 Adequate |
| | 8 Inadequate |
| | 4 Invalid |
| 28 Inadequate | 18 Adequate |
| | 6 Inadequate |
| | 4 Invalid |

## Discussion

The finding of large standard deviations on most variables confirmed the clinical observation that young children with learning disabilities are a heterogeneous group of children. Not only are there group differences which distinguish these children from children without learning disabilities, but there are individual differences which distinguish each child with a learning disability from the other members of his group. Although the patterns of functioning presented in this study are based on mean performances for the group, the means seem to describe very few children in the group. For example, the pre-treatment mean on the vocal encoding subtest of the ITPA was 58.3. The standard deviation was 18.55. This would mean that two-thirds of the children would fall between a low score of 40 and a high score of 77. This is an extremely wide range, and is indicative of a wide range of abilities between the subjects. Thus, the mean seems to describe very few children. They seem to be quite different from each other and to be idiosyncratic unto themselves.

In the analysis of group data, the findings of deficits in quantitative thinking, in the storage of information, in the learning of a sign-symbol association, and in visual perceptual abilites may suggest a deficit in the ability to manipulate concepts in such a way that new ideas and new relationships can be deduced. This deficit may reflect a deficit in Spearman's "G" factor and may suggest a generalized acculturation factor as the basic deficit in this group of children. This may be due to the large family structures, in which the children interact in a more limited way with their parents and receive less language stimulation from the adults in the home.

Some support for this hypothesis is found in the patterns of deficits on the ITPA, and in the specific gains made as the result of the experiences built into the modified curriculum of the developmental first grade.

These children apparently understand what they see and hear at a higher level than they can express themselves, or than they can store the information. This was apparent in their performance on both the WPPSI and the ITPA. Their strengths on these tests appear to be on measures involving Guilford's Convergent Semantic Production factor (N.M.), and the factor involving the Evaluation of Figural Units (E.F.U.). Deficits appear to involve the factors of Visual Memory for Figural Units (M.F.U.), Auditory Memory for Symbolic Units (M.S.U.), and Divergent Production of Semantic Classes (D.M.C.). The encoding dificits seem to lend themselves to most significant change (21 months in Vocal Encoding, and 18 months in Motor Encoding), suggesting that their early experiences did not provide adequate opportunity for the development of expressive language in these children. However, the large standard deviations make it necessary to say that some children change dramatically in these abilities, and some do not change at all.

The changes in Auditory-Vocal Association, which is similar to the Similarities subtest on the WPPSI, also suggest that the early deficits may be due to lack of experience with this type of task. Both Similarities and Auditory-Vocal Association correlate highly (.55 and .70) with the psycholinguistic quotient and total language age, and may have had a significant effect on the lowered scores as well as on the reported increases.

Some of the other intercorrelations found with this data need to be studied carefully for the additional insights that can be gained on the relationships among the variables studied. For instance, it was difficult to understand how the children could score high on Vocabulary on the WPPSI, and low on Vocal Encoding, since the two tasks seemed quite similar. The correlation of .34 would not indicate a close correspondence, however. In analyzing the two tasks, it became apparent that one task involves the number of responses, whereas the other is concerned with the quality of the response and not the quantity of responses.

The apparent disabilities in auditory discrimination reflect in part the immaturity which was apparent in many of the children. Even on a one-to-one basis, it was difficult to be certain that the children understood the directions. Many of them did not have the concepts of "same" and "different" which are required in this task. The distractibility of the children and their inability to screen out extraneous auditory stimuli made this test of questionable value as a measure of auditory discrimination in this group of children. In addition, the deficits in short term memory made it difficult for them to remember the directions. Emphasis needs to be placed in the kindergarten program on the training of auditory discrimination abilities.

The findings of this study have important implications for changes in the emphasis of the kindergarten curriculum. In general, these non-ready children seem to be "bottled up" children, to be passive receivers of information. Perhaps this is a by-product of the many hours most of them have spent in front of a television set in their preschool years. The kindergarten curriculum needs to concentrate on the verbal and motor expressive abilities, providing opportunities for the children to develop latent speech and language abilities. Additional emphasis also needs to be placed on the development of visual and auditory perception, particularly on auditory discrimination. It would appear that the kindergarten programs offer an ideal time to introduce a clinical approach to education, wherein the cognitive style of the learner can be matched with the cognitive demands of the task. It would appear the emphasis in the kindergarten program might well switch from the traditional focus on socialization and maturation to an emphasis on the developmental imbalances that appear to be present in some children. Full use of all specialists available in the schools, i.e., speech correctionists, psychologists, social workers, learning

specialists, etc., during the kindergarten year may facilitate the necessary clinical approach to the education of young children with specific learning disabilities.

Summary

This study of the cognitive, perceptual, and psycholinguistic development of 59 high-risk children placed in a modified first grade sought answers to three questions:

1. Can kindergarten teachers identify children who are not ready for the academic first grade curriculum, with a minimum of help from specialists?

2. What patterns of psycholinguistic development are found in this group of children?

3. What significant changes can be effected in a modified first grade through the remediation of specific deficits?

Kindergarten Screening and Identification Procedures. If the criteria outlined in the screening procedures used in the spring of the kindergarten year are followed, approximately 5% of the kindergarten population can be effectively identified by their teachers as being not ready to succeed in the regular academic first grade curriculum, with approximately 60% being boys, and 40% being girls. The major responsibility for the identification of these children is carried by the kindergarten teacher, with consultative help from the psychologists, the psychoeducational diagnosticians, the social workers, the nurses, and the speech correctionists. Final eligibility is the result of a group decision, supported by all pertinent data gathered by each member of the staff conference.

Patterns of Cognitive, Psycholinguistic, and Perceptual Development. The large standard deviation scores on all measures attested to the heterogeneity of the children in this group. Although data about the differences in the means has been presented in detail, the size of the variances suggests that the case studies may give more meaningful information than data gained from the use of parametric statistics.

Although the range in I.Q. as measured by the WPPSI was from 72 to 119, the mean full scale I.Q. of 90 was below the average performance of the standardization sample. Relative cognitive strengths appear on those subtests concerned with vocabulary, comprehension, picture completion, mazes, and geometric designs. Relative deficits appear to be on those subtests concerned with information, arithmetic, similarities, animal house, and block design. Unlike the standardization sample, there is a pattern of cognitive weaknesses and relative strengths on the WPPSI which produces a profile which is not flat.

The profile of psycholinguistic abilities as measured on the ITPA also presents a pattern of abilities and disabilities in a group of children whose mean language age for all subtests and total language scores are below the mean chronological age of the group, reflected in the psycholinguistic quotient of 84. They constitue a psycholinguistically heterogeneous group of chilren. Relative strengths appear to be in the decoding process, both auditory and visual. Disabilities are apparent in the encoding process and in auditory sequencing. Although scores on both association subtests are higher than the encoding subtests, the differences did not reach significance.

Visual perception, as measured by the five subtests of the Frostig Test, appears to be more than a year below the chronological age of the group, as reflected in the perceptual quotient of 84. A pattern of strengths and weaknesses was not apparent, with all five areas being uniformly low.

Similar data were obtained on the Visual Motor Integration Test, with the mean VMI age of the group more than a year below the mean chronological age.

Auditory discrimination abilities, as measured by the Wepman Test, appeared to be invalid or inadequate for 81% of the subjects. Of those tests which were valid, half of the children had inadequate auditory discrimination abilities.

The patterns of abilities and disabilities appear to be consistent across all measures. Non-ready children appear to have a pattern of specific abilities and disabilities, to be passive receivers of information, to have inadequate abilities to store the information, and to have specific deficits in both visual and auditory perception. However, large variations within the group suggest that these children are a heterogeneous group.

The Efficacy of the Developmental First Grade in Remediation of Deficits. Although a fairly clear pattern of strengths and weaknesses is apparent in this group of non-ready first graders, the most important question involves the change that can be effected by the special program of the developmental first grade.

The results of this study indicate that this is a psycholinguistically heterogeneous group of children, both before treatment and after treatment. The ITPA profiles are not flat, either before or after the developmental first grade year. The psycholinguistic quotient, which reflects the rate of psycholinguistic development, increased significantly from 83 to 92, a gain of nine points. Total language age increased 13 months in eight months, from 61 to 74. All subtests except Auditory Sequencing increased significantly, with gains ranging from 10 months to 21 months. Greatest gains were achieved in the association process and the encoding process. It can be concluded that this special educational intervention has accelerated the rate and increased the level of psycholinguistic development in this group of children.

The deficits in visual perception improved significantly over the eight month period, with the change being reflected in the increase in the perceptual quotient from 84 to 94. Gains on all subtests were significant, ranging from 10 months to 22 months. It was concluded that the subjects improved substantially in their level as well as their rate of visual perceptual development.

The rate of development was not increased in form copying abilities as measured by the Visual Motor Integration Test, although the mean gain for the group was significant, as reflected on the increase in Visual Motor Integration quotient from 82 to 87.

Auditory discrimination abilities appear to be remediable, with 61% of the subjects able to achieve a score of adequate on the posttreatment testing, whereas only 19% of the children had developed adequate auditory discrimination abilities at the time of the pretesting. However, 22 of the children were still rated as having inadequate or invalid tests at the end of the developmental first grade program.

Changes in psycholinguistic quotients, perceptual quotients, and visual motor integration quotients indicate that the rate of the development of these abilities can be changed significantly with the modified first grade program. These gains are even more dramatic in view of the slower rate of development in these subjects during the preschool and kindergarten years. Significant changes were noted on all variables measured, except auditory memory. The number of months gain in all cases was greater than would have been anticipated from a group of normal children over the same period of time. The developmental first grade appears to provide a vehicle for effectively remediating the specific deficits found in children judged to be not ready to succeed in an academic first grade program. It is possible that modifications of the goals of the kindergarten program and of the curriculum could facilitate this clinical approach to young children with specific learning disabilities.

## CHAPTER VI

## Behavior Patterns

Although the differences and changes in cognitive and perceptual functioning reported in Chapters III, IV, and V are important for children with learning disabilities, the resultant changes in the rate of academic achievement are even more significant. However, these areas constitute only a part of the total problem of managing these children in the public schools. The behavioral characteristics of these children are an integral part of the diagnostic and remedial dilemma.

Many authors have highlighted the importance of the interpersonal and social adjustment of the child with learning disabilities, and have attempted to list a set of behaviors which are characteristic of these children (Strauss and Lehtinen, 1947; Clements, 1966; Werry, 1968; Rabinovitch, 1959). However, these lists of characteristics seem too general, in that they could apply to all children, or too specific, in that they describe a particular subset of all children with learning disabilities. Few studies of new groups of children have been reported in recent literature. This part of the study in Schaumburg was an effort to systematically investigate the behavioral characteristics of children identified as having specific learning disabilities.

This chapter addresses itself to: (a) a description of the behavior patterns of a group of children who have been diagnosed and treated as children with special learning disabilities; (b) a comparison of these patterns with personality patterns of emotionally disturbed and normal children; and (c) a study of the effects of remediation upon observable behavior.

### Subjects

Thirty-six children, 32 boys and 4 girls, diagnosed as having specific learning disabilities served as subjects. (For the definition and criteria, see Chapter II.) The chronological ages at the start of the project ranged from 6-2 to 13-0, with a standard deviation of 1-8. Individual intelligence scale scores ranged from 71 to 123, with a mean of 96.0, and a standard deviation of 12.59. Grade placement ranged from 1.2 to 7.9, with a mean of 2.8 and standard deviation of 1.67.

The children were all enrolled in the itinerant learning disabilities program, which involved regular class placement plus individual or small group remediation by a psychoeducational diagnostician. For a detailed description of the program, see Chapter II.

Instrumentation

Data were collected by means of two instruments, the Behavior Problem Checklist, and the Q-Sort Behavior Analysis Test (Q-BAT). See Appendix B for copies of these instruments.

The Behavior Problem Checklist (Quay and Peterson, 1967) included 58 items representing most of the common problem behaviors of children referred to a child guidance clinic. The rater indicated on a three-point scale whether each problem behavior listed constituted no problem, a mild problem, or a severe problem as far as the child was concerned.

The Q-Sort Behavior Analysis Test is composed of 50 cards with items on them describing children's behavior. The items consist of such behaviors as "moods change frequently," "poor physical coordination," "respects the feelings of others," "obeys teacher."

The rating scale ranges from 1 to 11, with the lower ratings (1-5) indicating that the item is most applicable to the child's behavior. The higher ratings (6-11) indicate least applicability to the child.

The teacher or the mother is asked to place in one pile all the cards with statements that are like the child. In a second pile are placed all the cards with statements that are unlike the child. In a third pile are placed all the cards with statements about which the parent or teacher is unsure. The cards are then arranged on a card distribution board. From the pile of cards containing statements which describe the child, the one most like him is selected and placed on the square to the extreme left of the board. This procedure is followed until all cards have been distributed from left to right in descending order. By using the scoring sheet, perceived changes in behavior in the child can be recorded and computed.

Both the teachers and the mothers rated the child on both instruments at the start of the school year and at the end of the school year. The instruments were presented and explained by the four social workers. Thirty-four mothers and 32 teachers provided ratings on the children in an individual interview situation.

Statistical Treatment

Ratings on each instrument (131 ratings for the Behavior Problem Checklist and 231 ratings for the Q-BAT) were factor analyzed, using the squared multiple correlations as communality estimates. Rotation of factors was achieved by means of varimax technique (Kaiser, 1958). The number of factors to be retained was determined using the criterion of "significant gap" in the size of eigenvalues. Factor scores (in Z-score form) were computed for each subject on each factor by linear

combinations of the ratings weighted by the rotated factor loadings. The factor scores were used for subsequent analysis. Mean differences among the various factors within as well as between raters and conditions were tested by means of analysis of variance (Edwards, 1965), multiple comparisons (Scheffe, 1953), and by paired t-tests. The relationships among the various factors were expressed in Pearson correlation coefficients.

The results of this study are presented and discussed under the following major topics: (1) factor analysis of the Q-Sort Behavior Analysis Test; (2) factor analysis of the Behavior Problem Checklist; (3) comparison of profiles of normal, emotionally disturbed and learning disabled children; and (4) effects of psychoeducational remediation upon the behavior as measured by the Q-Sort Behavior Analysis Test and by the Behavior Problem Checklist as perceived by the teachers and the mothers.

Factor Analysis of Q-Sort Behavior Analysis Test

Four factors were rotated. Table 27 presents the items with high loadings on each of the four factors. Factor I suggests the dimension of cooperativeness with adults and children, and conformity with "conventional" standards. Factor II suggests acting-out conduct problem behavior which is extremely disruptive in the school setting. Factor III indicates alertness and sensitivity to the environment exhibited by perceptive individuals. Factor IV refers to immature and inadequate behavior which usually characterizes the passive and withdrawn person.

The four factors have been tentatively labeled as follows:

| | |
|---|---|
| Factor I | Conformity-Cooperativeness |
| Factor II | Disruptive Conduct-Problem |
| Factor III | Sensitivity-Alertness |
| Factor IV | Immature-Hypotonic |

Means, standard deviations, and intercorrelations of factor scores for mothers' and teachers' pretreatment and posttreatment ratings of the child's observed behavior are presented in Table 28. The means are graphically shown in Figure 10. To reverse the direction of Factor II and Factor IV, in computing factor scores, the signs of the factor loadings were reversed. It should be noted that, since small ratings on the Q-BAT indicate behavior which applies to the child, the smaller the factor scores, the more descriptive that factor is of the child's behavior. Inversely, large factor scores indicate that the behavior does not correspond to the factors.

Table 27

Items with High Loadings on Each of the Four Factors

Extracted from the Q-Sort Behavior Analysis Test Data

on Learning Disabled Children

| Factor I Conformity-Cooperativeness | | Factor II Disruptive Conduct-Problem | | Factor III Sensitivity-Alertness | | Factor IV Immature-Hypotonic | |
|---|---|---|---|---|---|---|---|
| Cooperates with other children | .40 | Moods change frequently | .47 | Cooperates with other Children | .40 | Daydreams | .47 |
| Cooperates with adults | .42 | Angers quickly | .36 | Respects feelings | .46 | Moves slowly | .58 |
| Obeys school rules | .38 | Stubborn | .51 | Alert | .34 | Poor physical coordination | .54 |
| Obeys mother | .40 | Talks too much | .40 | Inquisitive | .40 | Alert | -.51 |
| Obeys father | .35 | Craves attention | .51 | Uses good judgement | .37 | Little expression in speech | .28 |
| Obeys teacher | .49 | Cannot stand criticism | .39 | Uses imagination | .32 | | |
| Cheerful | .63 | Easily discouraged | .33 | Speech is adequate | .43 | | |
| Liked by other children | .45 | Reacts very emotionally | .32 | Concentrates well | .29 | | |
| Liked by adults | .60 | Destructive of property | .26 | | | | |
| Truthful | .51 | Seems worried | .29 | | | | |
| Polite | .58 | Concentrates well | -.54 | | | | |
| Steals | -.71 | Self discipline | -.57 | | | | |
| Destructive of property | -.54 | Uses profanity | .23 | | | | |
| Bullies others | -.56 | Completes task undertaken | -.56 | | | | |
| Uses profanity | -.67 | Can be depended upon | -.48 | | | | |
| Disrupting classroom | -.36 | Disruptive | .33 | | | | |
| | | Bullies others | .32 | | | | |

TABLE 28

Means, Standard Deviations and Intercorrelations for Factor Scores Extracted from the Q BAT for Teachers' and Mothers' - Ratings of the Child's Observed Behavior.

| | Mean | SD | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Teachers-Pre** | | | | | | | | | | | | | | | | | |
| 1 Factor I | -.53 | .93 | 1.00 | | | | | | | | | | | | | | |
| 2 Factor II | .64 | .94 | -.32 | 1.00 | | | | | | | | | | | | | |
| 3 Factor III | .69 | 1.01 | -.82** | .63** | 1.00 | | | | | | | | | | | | |
| 4 Factor IV | .79 | 1.11 | -.41* | .68** | .60** | 1.00 | | | | | | | | | | | |
| **Teacher-Post** | | | | | | | | | | | | | | | | | |
| 5 Factor I | -.35 | 1.02 | .58** | .19 | .30 | .11 | 1.00 | | | | | | | | | | |
| 6 Factor II | .47 | .93 | -.12 | .08 | .05 | -.08 | -.49** | 1.00 | | | | | | | | | |
| 7 Factor III | .41 | .97 | -.41* | -.02 | .31 | -.02 | -.74** | .74** | 1.00 | | | | | | | | |
| 8 Factor IV | .61 | .99 | .06 | .06 | -.05 | .21 | -.34* | .70** | .63** | 1.00 | | | | | | | |
| **Mothers-Pre** | | | | | | | | | | | | | | | | | |
| 9 Factor I | .00 | .93 | .43* | .30 | -.24 | .17 | .54** | .04 | -.24 | .14 | 1.00 | | | | | | |
| 10 Factor II | .46 | .66 | .13 | -.04 | .14 | -.19 | .08 | -.14 | -.23 | -.29 | -.40* | 1.00 | | | | | |
| 11 Factor III | .53 | .76 | -.12 | -.19 | .07 | -.27 | -.19 | .12 | -.03 | -.38* | -.75** | .76** | 1.00 | | | | |
| 12 Factor IV | .37 | .73 | -.31 | .16 | .38* | .23 | -.04 | -.20 | -.11 | -.29 | -.45** | .65** | .63** | 1.00 | | | |
| **Mothers-Post** | | | | | | | | | | | | | | | | | |
| 13 Factor I | .07 | .97 | .43* | .42* | -.14 | .32 | .55** | .00 | -.20 | .19 | .89** | .33 | -.74** | -.41 | 1.00 | | |
| 14 Factor II | .08 | .82 | .15 | -.16 | -.09 | -.41* | .14 | -.18 | -.05 | -.41* | -.06 | .39* | .39* | .28 | -.34* | 1.00 | |
| 15 Factor III | .05 | .87 | -.13 | -.25 | .10 | -.36* | -.07 | -.24 | .00 | -.47** | -.46** | .34* | .66** | .41 | -.66* | .75** | 1.00 |
| 16 Factor IV | .06 | .73 | -.20 | .06 | .29 | .00 | .00 | -.19 | .09 | .34* | -.09* | .26 | .33* | .58** | -.25 | .76** | .68** |

*P < .05; ** P < .01

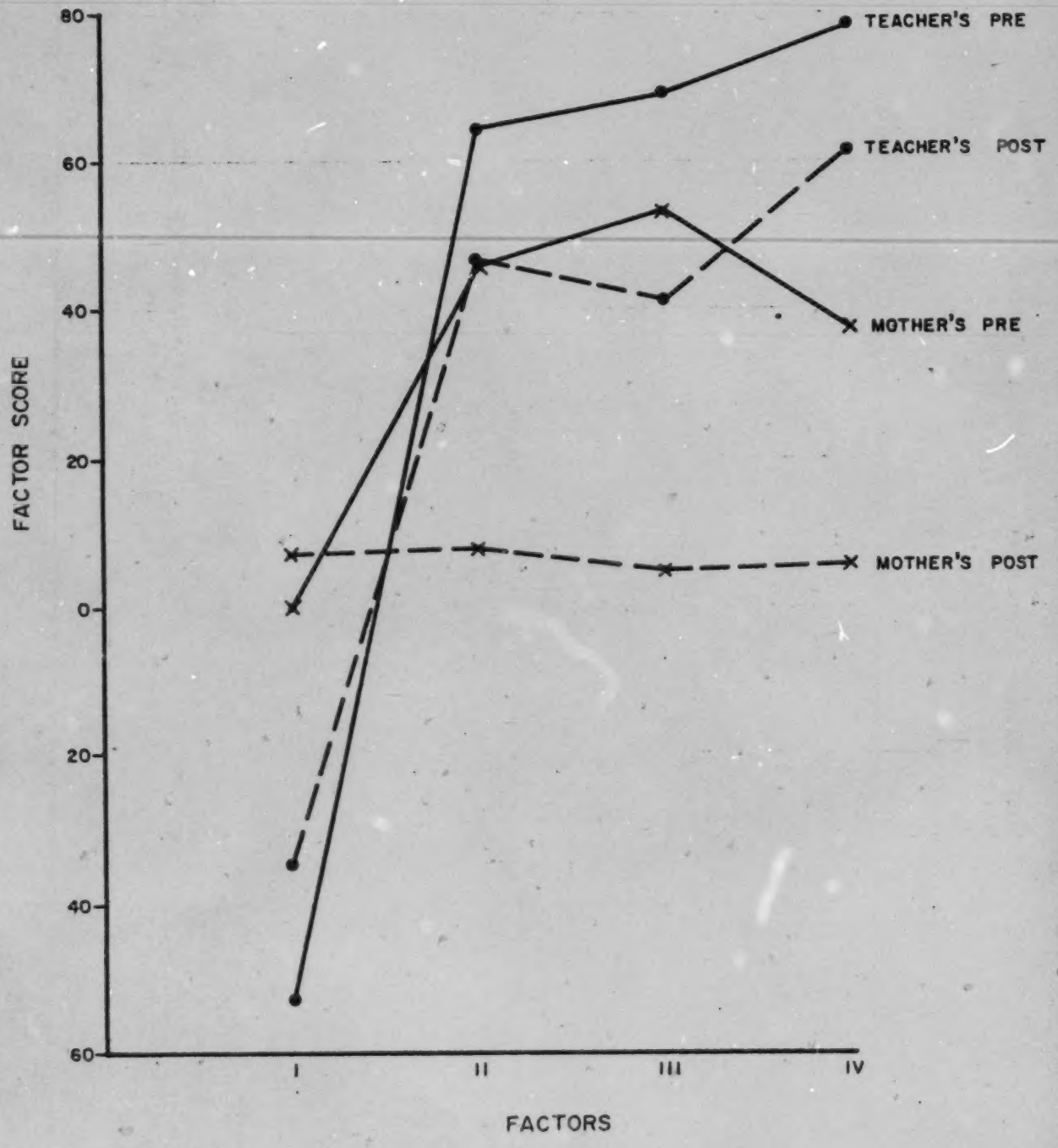

80
60
40
20
0
20
40
60
FACTOR SCORE
I
II
III
IV
FACTORS
TEACHER'S PRE
TEACHER'S POST
MOTHER'S PRE
MOTHER'S POST



Figure 10
-88-

Correlations among Factor Scores. Although the factors themselves were independent of each other, the factor scores for each group (teachers and mothers, pre- and posttreatment) are highly correlated. The high correlation may be the result of a halo effect, reflecting a generalized positive or negative perception of the child.

Factor I, the Conformity-Cooperativeness factor, correlates negatively with the other three factors, particularly with Factor III, the Sensitivity-Alertness factor.

Inter-rater reliability, as reflected in the correlations between mothers' and teachers' ratings in both pretreatment and posttreatment situations, is relatively low, with the exception of Factor I. Correlations between factor scores of teachers' and mothers' ratings on Factor I were .43 for the pretreatment data, and .55 for the posttreatment data. For the other three factors the correlations range from -.34 to .23, with a median of -.05. The low agreement between mothers' and teachers' ratings of the child might result from the fact that the contacts the teacher and the mother have with a child are in different environmental situations and role relationships.

Rating stability for the pretreatment and posttreatment data (nine-month interval) was high for the mothers, ranging from .34 to .89. The stability for the teachers was .54 for Factor I and consistently low for the other three factors.

Table 29 presents the results of tests of significance of the differences among the factors within each group (teachers - mothers) and conditions (pretreatment - posttreatment). For both pretreatment and posttreatment data for the teachers, it can be noted that teachers perceived disruptiveness, non-alertness, and immaturity as being far more descriptive of the child than cooperativeness-conformity. It must be kept in mind that these ratings are intra-individual, and do not suggest that these children are more or less disruptive, immature, cooperative, or alert than other children in their class. No attempt has been made to obtain data relating this group to others.

The pretreatment data for the mothers exhibited the same characteristics as that of the teachers. The posttreatment data showed a reduction in the discrepancy among the factors, which is reflected in the flattened profile.

Inspection of the means as presented in Table 28 and in Figure 10, suggests that teachers perceived the children as more disruptive, less alert, more immature, and more cooperative than mothers did. The differences were significant for the posttreatment data, and were seen as a trend in the pretreatment data, (Table 30).

Table 29

t Values for Mean Differences Among Pre- and Posttreatment

Factor Scores for Teachers and Mothers

on Q-Sort Behavior Analysis Test Data on Learning Disabled Children

| | Teachers | | Mothers | |
|---|---|---|---|---|
| | Pretreatment t Values (df=32) | Posttreatment t Values (df=27) | Pretreatment t Values (df=27) | Posttreatment t Values (df=27) |
| Factor I vs Factor II | 6.16** | 5.42** | 2.69* | .01 |
| Factor I vs Factor III | 3.82** | 2.45* | 1.78 | .01 |
| Factor I vs Factor IV | 4.19** | 4.99** | 2.20* | .01 |
| Factor II vs Factor III | .17 | .20 | .28 | .22 |
| Factor II vs Factor IV | 1.04 | 1.13 | .81 | .01 |
| Factor III vs Factor IV | .31 | .67 | .64 | |

*p < .05; **p < .01

Table 30

t-Values for Mean Differences Between Mother's and Teacher's Ratings on Four Factors on Q-Sort Behavior Analysis Test with Learning Disabled Children

| | Pretreatment t-Values (df=33) | Posttreatment t Values (df=27) |
|---|---|---|
| Factor I | 2.83** | 2.87** |
| Factor II | .22 | 2.16** |
| Factor III | ,46 | 2.06* |
| Factor IV | 1.53 | 4.41* |

*p < .05; ** p < .01

In summary, the findings of this part of the study can be summarized as follows:

1. The Q-BAT yields four factors with this group of learning disability children: Factor I, Conformity-Cooperativeness; Factor II, Disruptive Conduct-Problem; Factor III, Sensitivity-Alertness; Factor IV, immature-Hypotonic.

2. Teacher-mother reliability was low except for Factor I.

3. Nine month stability (before and after remediation) was relatively high for the mothers and consistently low for the teachers except on Factor I.

4. At the outset of the project, both mothers and teachers perceived the child's behavior as more disruptive, less alert, and more immature than cooperative. After nine months of remediation, teachers ranked the four factor areas as they did in the beginning of the project. Mothers, however, saw significant improvements in the four areas, with the result that the profile became flat.

5. Both before and after remediation, the teachers perceived the child's behavior as more disruptive, less alert, more immature than mothers did. They also rated the child as being more cooperative than the mothers did.

Factor Analysis of Behavior Problem Checklist

A total of 131 ratings were analyzed. Items which were noted in less than 5% of the cases were eliminated from the analysis. Of the 24 items, with a frequency of occurrence of less than 5%, 13 were of a physiological nature, such as: dizziness, skin allergy, stomachaches, etc. The remaining can be categorized as psychological behaviors such as the following: doesn't know how to have fun; behaves like a little adult; temper tantrums; truancy from school; depression, chronic sadness; aloofness, social reserve; destructiveness in regard to his own and/or others' property; negativism, tendency to do the opposite of what is requested; impertinence, sauciness; profane language, swearing, cursing; prefers to play with older children; specific fears, e.g., of dogs, of the dark. The remaining 34 items were intercorrelated and subjected to factor analysis. Four factors were extracted. Items with high loadings on each of the four factors are presented in Table 31.

Factor I suggests aggressive, hostile and contentious behavior. Factor II indicates passivity, introverted and withdrawn behavior. Factor III includes feelings of inferiority, laziness, dislike for school, hypersensitivity, and lack of confidence.

Items in Factor IV overlap with the items in the other factors making it appear that this factor is not a distinct dimension. In addition to item inspection, further support of comparability of the first

Table 31

Items with High loadings on Each of the Four Factors

Extracted from the Behavior Problems Checklist Data

on Learning Disabled Children

| Factor I Socialized Aggression | | Factor II Immaturity-Hyperkinetic | | Factor III Neuroticism-Disturbance | | Factor IV | |
|---|---|---|---|---|---|---|---|
| Restless | .66 | Preoccupation | .68 | Self-conscious | .80 | Inattentive | .4 |
| Attention seeking | .75 | Shyness | .38 | Feeling of inferiority | .68 | Easily flustered | .6 |
| [illegible] | .79 | Withdrawn | .35 | Crying over minor annoyance | .50 | Reticence | .5 |
| [illegible] | .73 | Short attention span | .43 | Dislike for school | .50 | Hypersensitivity | .5 |
| [illegible] school | .31 | Inattentive | .48 | Jealous | .38 | Anxiety | .5 |
| [illegible] | .38 | Lack of interest | .61 | Shyness | .34 | Tension | .3 |
| Short attention span | .51 | Irresponsibility | .53 | Withdrawn | .33 | Passivity | .4 |
| Prefer younger children | .48 | Lazy | .55 | Lack of confidence | .48 | Clumsiness | . |
| Fighting | .66 | Daydreams | .80 | Hypersensitivity | .41 | Restless | . |
| Irresponsibility | .41 | Passivity | .37 | Anxiety | .49 | Crying over minor annoyances | . |
| Tension | .47 | | | Tension | .45 | Prefer younger children | . |
| Disobedience | .82 | | | Irritability | .40 | | |
| Uncooperativeness | .69 | | | | | | |
| Hyperactivity | .61 | | | | | | |
| Distractability | .67 | | | | | | |

three factors derived by Quay and Peterson (1966) is suggested by Tucker's coefficients of factor similarity (Quay and Quay, 1965). (These coefficients were obtained by the formula:)

$$\frac{a_i a_j}{\sqrt{a_i^2 a_j^2}}$$

where $a_i$ and $a_j$ are rotated factor loadings of pairs of factors

The coefficients are presented in Table 32. It can be seen that Factors I, II, and III, as derived by Quay and Peterson (1966) in the present study, exhibit high coefficients of similarity. Also Factor IV overlaps with the other factors, but primarily with Factor III.

These results suggest that the proposed schema of three factors, unsocialized-aggression, immaturity, and neuroticism-disturbance, to describe children's behavior, is generalizable to children diagnosed as having special learning disabilities.

Table 33 Presents the intercorrelations of factor scores for teachers and mothers for both pretreatment and posttreatment data. Although the factors themselves were orthogonal, the factor scores for each group (mothers and teachers) and each condition (pre- and posttreatment) were correlated for Factor II, III, and IV, but not for Factor I. It seems that immaturity and neuroticism were seen by mothers and teachers as being relatively undifferentiated. Mothers and teachers perceived immature characteristics as concurrent with neurotic characteristics.

The agreement between teachers' and mothers' ratings was relatively low, ranging from .20 to .52 for the pretest data, and .43 to .62 for the posttreatment data. Stability over a nine month period for teachers ranged from .70 to .88, and for mothers from .65 to .91. Factor I was more stable than the other factors. Teachers and mothers saw little change in the child's behavior as judged by the relatively high correlations between pre- and posttreatment ratings.

In summary, the Behavior Problem Checklist yielded four factors with children with specific learning disabilities. The first three were:

| | |
|---|---|
| Factor I | Unsocialized Aggression |
| Factor II | Immaturity-Hypotonic |
| Factor III | Neuroticism-Disturbance |

Factor IV overlapped greatly with the other three factors. Also, the immaturity and neuroticism factors were perceived by the mothers and teachers as concurrent behavior.

Table 32

Coefficients of Factor Similarity of Behavior Problem Checklist Ratings for Learning Disabled and Emotionally Disturbed Children

| | Emotionally Disturbed | | |
|---|---|---|---|
| Learning Disabled | Factor I | Factor II | Factor III |
| Factor I | .89 | .22 | .13 |
| Factor II | .21 | .84 | .36 |
| Factor III | .25 | .74 | .86 |
| Factor IV | .38 | .43 | .71 |

Table 33

Intercorrelations* for Factor Scores Extracted from the Behavior Problem Checklist for Teachers and Mothers

( N= 36 )

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Teachers Pretreatment** | | | | | | | | | | | | | | | |
| 1. Factor I | | | | | | | | | | | | | | | |
| 2. Factor II | 05 | | | | | | | | | | | | | | |
| 3. Factor III | 25 | 18 | | | | | | | | | | | | | |
| 4. Factor IV | 39 | 75 | 44 | | | | | | | | | | | | |
| **Teachers Posttreatment** | | | | | | | | | | | | | | | |
| 5. Factor I | 88 | 04 | 19 | 39 | | | | | | | | | | | |
| 6. Factor II | 00 | 70 | 34 | 60 | 16 | | | | | | | | | | |
| 7. Factor III | 24 | 13 | 75 | 43 | 39 | 48 | | | | | | | | | |
| 8. Factor IV | 30 | 53 | 61 | 77 | 41 | 82 | 71 | | | | | | | | |
| **Mothers Pretreatment** | | | | | | | | | | | | | | | |
| 9. Factor I | 52 | -01 | -01 | 23 | 57 | -01 | 02 | 12 | | | | | | | |
| 10. Factor II | -22 | 41 | -05 | 28 | -08 | 45 | 16 | 30 | 00 | | | | | | |
| 11. Factor III | -01 | 21 | 20 | 41 | 17 | 25 | 24 | 30 | 43 | 27 | | | | | |
| 12. Factor IV | 14 | 43 | 19 | 51 | 15 | 35 | 16 | 43 | 33 | 58 | 42 | | | | |
| **Mothers Posttreatment** | | | | | | | | | | | | | | | |
| 13. Factor I | 63 | -12 | 02 | 18 | 62 | 00 | 23 | 16 | 91 | 02 | 33 | 15 | | | |
| 14. Factor II | 21 | 47 | 12 | 58 | 23 | 44 | 36 | 45 | 09 | 70 | 25 | 44 | 20 | | |
| 15. Factor III | 32 | 07 | 34 | 40 | 43 | 24 | 55 | 37 | 38 | 32 | 75 | 16 | 53 | 42 | |
| 16. Factor IV | 39 | 27 | 21 | 58 | 33 | 20 | 34 | 43 | 27 | 46 | 23 | 65 | 39 | 87 | 43 |

* All numbers have been multiplied by 100

The three factors derived from these data with learning disability children are similar to factors reported by Quay (1964) with other groups of children. This finding suggests that the three-dimensional model, i.e., unsocialized-aggression, immaturity-hypotonic, and neuroticism-disturbance, is applicable to children with special learning disabilities.

The next section discusses the differences in behavior patterns of children with learning disabilities, emotionally disturbed children, and normal children, utilizing the three-dimensional schema described above.

A Comparison of the Behavior of Normal, Emotionally Disturbed, and Learning Disabled Children

Educators concerned with the educational placement of exceptional children daily face the dilemma of answering such questions as "Is he emotionally disturbed, or does he have a learning disability?" "Is he mentally retarded, or perceptually handicapped?" "Is it a behavior problem, or is it a minimal brain dysfunction?"

Underlying such questions is the jurisdictional dispute between educators and those professions ancillary to education over who should properly serve this child. If he is "emotionally disturbed," he "should" be served primarily by the psychiatrist, the psychologist, the social worker, and placed in a class for the emotionally disturbed. If he is "brain-injured," he "should" be served by the neurologist, the psychologist, the school nurse, and put in a class for the neurologically impaired. If he has a "learning disability," without evidence of minimal brain dysfunction, he "should" be served by the teaching profession. If he is "mentally retarded," he "should" be placed in a class for educable mentally retarded children. If his problem is viewed primarily as a behavior problem, i.e., he is not psychotic, not retarded, and not perceptually handicapped, he should be served by the social worker, the guidance counselor, the psychologist, and perhaps placed in a class for socially maladjusted children.

Implicit in these questions and procedures is the assumption that these groups of children are so different that such dichotomies are possible, and that the cognitive, perceptual, psycholinguistic and social behaviors of the children vary significantly between groups, necessitating different treatment procedures and treatment methods.

The present study addresses itself primarily to the assumption that learning disabled children can be differentiated from emotionally disturbed children in terms of observable social behaviors. Specifically, this study compares the patterns of problem behaviors of children with learning disabilities, emotionally disturbed children and average children.

Subjects. Thirty-six children with specific learning disabilities, 41 average children, and 100 children in special classes for emotionally disturbed served as subjects. The children with specific learning disabilities are described in detail earlier. The average children were selected by the classroom teacher as being most typical of children in regular classes. The emotionally disturbed children were selected randomly from the 441 children studied by Quay, Morse, and Cutler (1966). This latter group consisted of children in special classes for emotionally disturbed in a variety of school systems.

Procedure. Teachers' ratings of the child's behavior on the Behavior Problem Checklist were obtained. Utilizing the rotated factor loadings for the three factors (Conduct Problem, Inadequacy-Immaturity, and Personality Problem) as reported by Quay, (1964), factor scores were computed for each subject. Linear combinations of the raw scores weighted by the rotated factor loadings have been used in subsequent analyses.

Statistical Analysis. Means, standard deviations, and intercorrelations among the factor scores for each group were computed. Two-way analysis of variance with repeated measures (Edwards, 1965) was used to test mean differences for significance among groups and factors.

Results. Means, standard deviations, and intercorrelations for the three factors in each group are presented in Table 34. The means are graphically presented in Figure 11. Although the factors themselves were orthogonal, the factor scores for the groups were highly correlated. The correlations for the emotionally disturbed groups ranged from .57 to .86, for the learning disabilities group form .88 to .92, and for the average group from .86 to .91.

These correlations may reflect a generalized attitude, positive or negative, toward the children whom they were rating. Although the dimensions on which the teacher and the mother were asked to rate the child have been derived independently of each other, i.e., the presence of a behavior on a factor does not necessarily imply the presence or absence of a behavior on another factor, ratings of the teachers were relatively consistent from factor to factor.

Table 35 presents a summary of analysis of variance of factor scores for the emotionally disturbed, learning disabled, and average children. Mean differences for the three factors averaged over the three groups were statistically significant ($F_{2/348} = 1211.35$; $p$ .01). This significant statistic indicates that the means on the three factors are significantly different across the three groups. The mean differences for the three groups averaged over the three factors were statistically significant ($F$ 2/179 = 581.48; $p < .01$). This finding suggests that the ratings teachers assigned to emotionally disturbed, learning disabled,

Table 34

Means, Standard Deviations and Intercorrelations of Factor Scores for Emotionally Disturbed, Learning Disabled and Average Children

| | Emotionally Disturbed (N = 100) | | | | | Learning Disabled (N = 36) | | | | | Average (N = 41) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Correlated with | | | | | Correlated with | | | | | Correlated with | | |
| | Mean | SD | I | II | III | Mean | SD | I | II | III | Mean | SD | I | II | III |
| Factor I | 27.1 | 5.31 | 1.00 | | | 12.3 | 5.14 | 1.00 | | | 3.4 | 2.83 | 1.00 | | |
| Factor II | 14.6 | 2.52 | .86** | 1.00 | | 5.7 | 2.52 | .92** | 1.00 | | 1.7 | 1.34 | .86** | 1.00 | |
| Factor III | 13.1 | 1.94 | .57** | .78** | 1.00 | 5.9 | 2.37 | .88** | .89** | 1.00 | 1.2 | 1.20 | .86** | .91** | 1.00 |

**p<.01

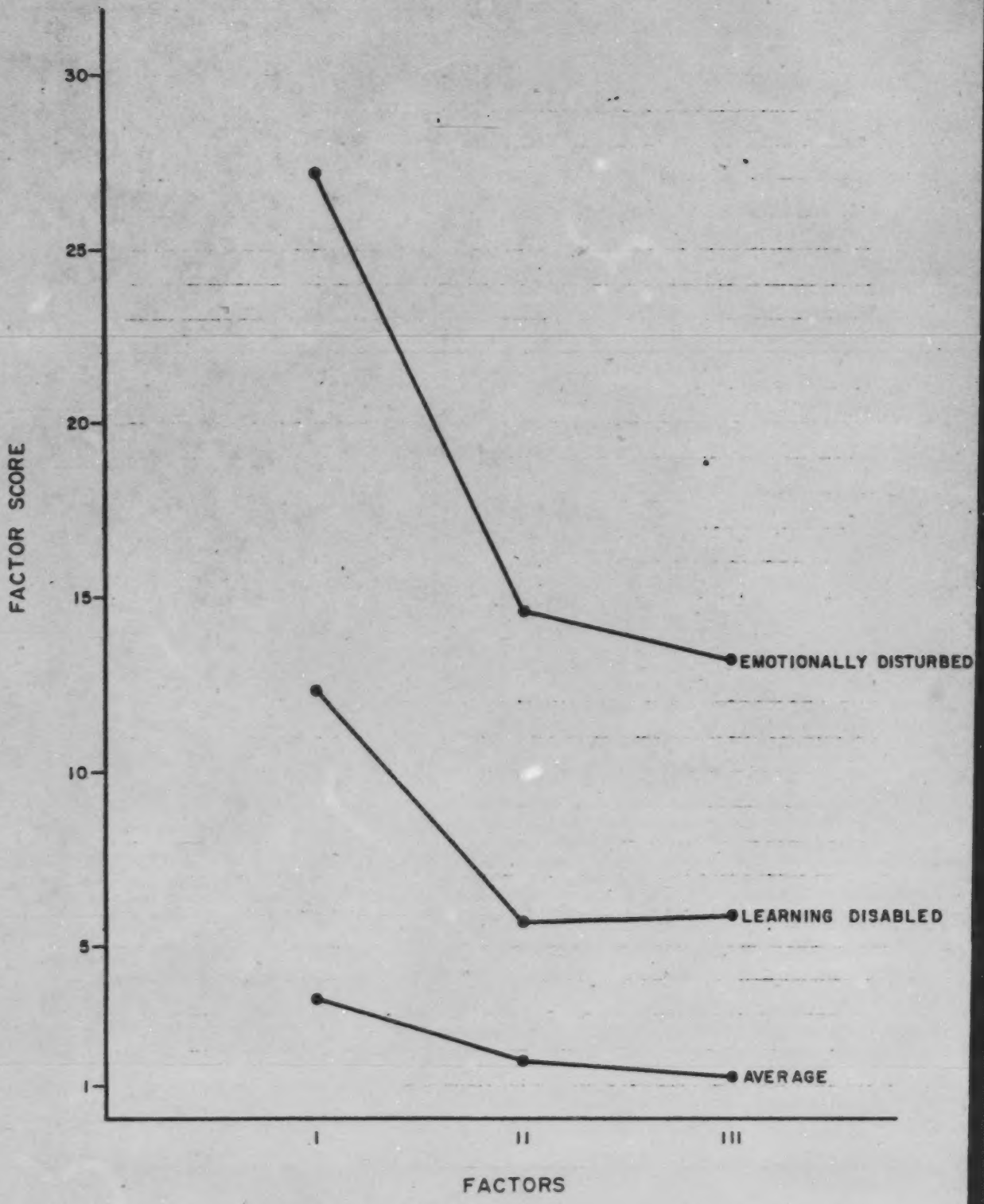





Figure 11
-100-

Table 35

Summary of Analysis of Variance of Factor Scores

for Emotionally Distubed, Learning Disabled and Average Children

| Source of Variation | Mean Squares | df | F |
|---|---|---|---|
| Groups | 12734.7 | 2 | 581.48** |
| Error (a) | 23.62 | 174 | |
| Factors | 5111.9 | 2 | 1211.35** |
| Group X Factor | 694.8 | 4 | 164.64* |
| Error (b) | 4.22 | 348 | |

**p < .01

and average children across the three factors are significantly different. The group factor interaction was statistically significant ($F_{4/348} = 164.64$; $p < .01$). This result shows that the patterns of the intra-factor relationships are different for the group main effects.

The interactions were explored by means of multiple comparisons (Scheffe, 1957). Table 36 presents the results of these multiple comparisons between emotionally disturbed, learning disabled, and average children averaged over the three factors. It can be seen that mean differences among the three factors are significantly different for all groups, emotionally disturbed ($F_{2/188} = 985.54$; $p < .01$), learning disabilities ($F_{2/270} = 4.18$; $p < .01$), and average children ($F_{2/280} = 44.50$; $p < .01$). These findings indicated that mean ratings assigned to the three factors are different within each group.

Multiple comparisons for mean differences among the three factors within each group are presented in Table 37. The result of these multiple comparisons among factors show that: (a) for the emotionally disturbed group all possible combinations, Factor I vs. Factor II, Factor I vs. Factor III, and Factor II vs. Factor III, are significantly different ($p < .01$); (b) for the learning disabilities group the combinations Factor I vs. Factor II and Factor I vs. Factor III reach significance. The combination Factor II vs. Factor III was not statistically significant ($p < .01$); (c) for the average children only the comparison of Factor I vs. Factor II reached significance ($p < .05$). These findings suggest that emotionally disturbed children are rated differentially by their teachers on all three factors, and learning disabled children are rated differentially only on the first factor. The profile of the average children is relatively flat.

Summary. These findings indicate that conduct-problem behavior appears to be the main characteristic of both emotionally disturbed and learning disabled children.

For the average children, behaviors on the three factors are observed with equal frequency. This is also true for the Immaturity-Inadequacy and Personality Problem factors in the learning disabilities group. In the emotionally disturbed group, however, ratings on observed behavior on all three factors occur with different frequency, conduct-problem behavior being the most frequently observed, followed by immaturity and neuroticism.

Effects of Remediation upon the Behavior Patterns

As mentioned in early sections of this chapter, data from the Q-Sort Behavior Analysis Test and the Problem Behavior Checklist were subjected to factor analysis. The first three factors extracted from the Behavior Checklist were tentatively labeled Conduct Problem, Immaturity, and Personality Problem. The four factors extracted from the Q-Sort

Table 36

Summaries of Analysis of Variance of Factor Scores

for Emotionally Disturbed, Learning Disabled and Average Children

| | Emotionally Disturbed | | | Learning Disabled | | | Average Children | | |
|---|---|---|---|---|---|---|---|---|---|
| Source of Variation | MS | df | F | MS | df | F | MS | df | F |
| Subjects | 26.79 | 99 | 4.44** | 31.4 | 35 | 1.96* | 8.87 | 40 | 7.45** |
| Factors | 5941.81 | 2 | 985.54** | 67.0 | 2 | 4.18** | 52.95 | 2 | 44.50** |
| Error | 6.03 | 188 | | 16.01 | 70 | | 1.19 | 80 | |

*p<.05; **p<.01

Table 37

S-Values for Multiple Comparisons Among the Factors

for Emotionally Disturbed, Learning Disabled and Average Children

| | Emotionally Disturbed | Learning Disabled | Average Children |
|---|---|---|---|
| Factor I vs. Factor II | 35.71** | 13.75** | 2.24 |
| Factor I vs. Factor III | 40.00** | 13.33** | 2.89 |
| Factor II vs. Factor III | 4.29** | -.42 | .92 |
| Sd | .35 | .48 | .76 |

*p<.01; **p<.01

Behavior Analysis Test were labeled Conformity-Cooperativeness, Disruptive-Conduct Problem, Sensitivity-Alertness, and Immature-Hypotonic. Using the rotated loadings, factor scores were computed for each factor for the pre- and posttreatment ratings for both teachers and mothers. The effects of the remediation upon the behavior were studied by comparing the mean factor scores on the pretreatment data and the posttreatment data. Paired t tests were computed for mean differences between pretreatment and posttreatment factor scores on each of the factors for both teachers and mothers.

Table 38 presents t values for mean differences between factor scores for pre- and posttreatment for both teachers and mothers on the Behavior Problem Checklist. It can be seen that for the teachers, the only significant difference is on Factor I Conduct Problem ($t_{32} = 2.25$; p .05). The posttreatment mean on Conduct Problem factor was higher than it was on the pretreatment data.

The other comparisions did not reach significance, suggesting that the teachers saw little change in the child's behavior, after a year of remediation, except on the conduct problem dimension. This may be a function of resentment on the part of the teacher at the special attention being given the child by the learning disability teacher. It may also reflect an increase in conduct problem behavior as the year progressed, although observation would not confirm this in many cases.

For the mothers, although there is a trend for the mean scores from the posttreatment data to be consistently lower (except on Factor I), this trend was not statistically significant. Mothers reflect some change in their perception of the child's behavior, reflecting improvement in all areas except conduct problem behavior.

Table 39 presents t values for mean differences between factor scores on the Q-Sort Behavior Analysis Test for pretreatment and posttreatment data for teachers and mothers. For teachers, the trend is for the mean posttreatment ratings to be smaller than the pretreatment ratings. The differences were not statistically significant. For the mothers (except for Factor I), mean differences between pretreatment and posttreatment data on the Q-Sort Behavior Analysis Test were statistically significant ($p < .05$). This finding suggests that mothers perceive the children, after nine months of treatment, as less disruptive, more sensitive and alert, and less immature than they did at the start of the project. Changes in behavior on the Q-Sort Behvior Analysis Test were also assessed by comparing the correlation between ideal and observed behavior at the start of the project and at the end of the treatment. The correlation was computed by means of the formula below:

Table 38

t Values for Mean Differences Between Factor Scores for Pre and Posttreatment for both Teachers and Mothers on the Behavior Problem Checklist

| | | Teachers | Mothers |
|---|---|---|---|
| | Variables | t Values (df=32) | t Values (df=27) |
| Factor I | Conduct Problem | 2.25* | 1.06 |
| Factor II | Immaturity | .67 | 1.38 |
| Factor III | Personality | 1.32 | .57 |
| Factor IV | | .17 | .01 |

*$p < .05$

Table 39

t Values for Mean Differences Between Factor Scores on the Q-Sort Behavior Analysis Test for Pre- and Posttreatment for Teachers and Mothers

| | Teachers t Values (df=32) | Mothers t Values (df=27) |
|---|---|---|
| Factor I Conformity-Cooperativeness | 1.81 | .57 |
| Factor II Disruptive-Conduct Problem | 1.08 | 2.12* |
| Factor III Sensitivity-Alertness | 1.52 | 2.16* |
| Factor IV Immature-Hypotonic | .93 | 2.15* |

*$p < .05$

$$r = 1 - \frac{6\,D^2}{n(n^2-1)}$$

where r is the rank correlation coefficient D is difference between the ideal and observed n is the number of cards

For the teachers, the median correlations for the pre- and posttreatment data were .01 and .07 respectively, ranging in the pretreatment data from .56 to -.43, and for the posttreatment data from .56 to -.34. Two-thirds of the children were perceived by their teachers as closer to the ideal at the end of the project than they were at the start of the project. The other one-third either did not change, or their observed behavior was more discrepant from the ideal behavior at the end of the project than it was at the outset.

For the mothers the median correlation for the pretreatment and posttreatment data was .19 and .45 respectively ranging from .72 to -.62 for the pretreatment data and .86 to -.14 for the posttreatment data. Consistently for all subjects (except one) mothers perceived the behavior of the children at the end of the treatment as having less disparity from the ideal behavior than they did at the outset of the project.

Summary. The effects of remediation upon the behavior ratings of mothers and teachers on both the Behavior Problem Checklist and the Q-BAT can be summarized as follows:

1. Teachers saw little change in the child's behavior after a year of remediation, except on the conduct-problem dimension, which was higher in the posttreatment ratings;

2. Mothers' ratings reflected some improvement in all areas except conduct problem behavior. They perceived the children as less disruptive, more sensitive, alert, and less immature.

3. Teachers and mothers perceived most of the children as closer to their ideals at the end of the project.

## Discussion

A cursory review of the extensive lists of the signs and symptoms which have been attributed to children with specific learning disabilities makes it readily apparent that every behavior that can be attributed to any child can also be attributed to these children. These children appear to exhibit behaviors, and clusters of behaviors, which are characteristic of children in general and not idiosyncratic to one clinical or diagnostic entity. The existence of clusters of

behavior in children with specific learning disabilities which form a recognizable clinical syndrome needs careful investigation.

An effort has been made in this study to delineate the behavior patterns of these children. One of the main findings of this study is that teachers perceive and rate the behavior of emotionally disturbed, learning disabled, and average children as different. Teachers of emotionally disturbed children perceive in their pupils more problem behaviors of greater severity than do either teachers of learning disabled or average children. Teachers of learning disabled children perceive in their pupils fewer problems and/or problems of less severity than do teachers of emotionally disturbed children. However, these problems are more numerous and of greater severity than those perceived in children in regular classes.

The typical child in classes for emotionally disturbed is perceived by his teacher as more of a conduct problem, more immature and more neurotic than the typical child in either a learning disability class or in a regular class. The study suggests that the typical emotionally disturbed or learning disabled child exhibits at one time or another elements of all three types of behavior (unsocialized aggression, inadequacy-immaturity, and neuroticism) with a frequency and a severity which reliably differentiate the two groups from each other and from the typical child in the regular class. This finding is in agreement with the results of an unpublished study by McCarthy and Paraskevopoulos. Frequency distributions of teachers' ratings showed that of the 58 items on the checklist, 34 occurred in more than 5% of the children with learning disabilities, while Quay, Morse and Cutler (1966), using the more stringent criterion of 10% found 42 items occurring in emotionally disturbed children. The majority of the eight items commonly reported with the emotionally disturbed children and not with the learning disabled children were physiological or psychosomatic in nature, i.e., drowsiness, headaches, stomachaches. Teachers and mothers perceive them to be more disruptive, less alert, and more immature than cooperative. They have frequent mood changes, anger quickly, are stubborn, crave attention, cannot stand criticism, are easily discouraged, react emotionally, worry, are poorly disciplined, cannot be depended upon, do not respect the feelings of others, daydream, are poorly coordinated, etc. Elements of conduct-problem behavior, immature behavior, and neurotic behavior are all present in these children. Conduct-problem behavior is the most frequently observed, followed by immaturity and neuroticism.

Are these personality patterns different from those of emotionally disturbed or normal children? The data suggest that emotionally disturbed children's behavior looks very much like the behavior of learning disabled children, only more so. The same behaviors appear to be present in both groups, but with more severity or greater frequency in the emotionally disturbed group.

In addition to differences in levels of behavior, important differences in profiles were found. Analyses of intra-group differences on the three factors suggested that: (a) the emotionally disturbed children as a group exhibit more conduct problem behavior than they do either immature or personality problem behavior, and they are more immature than neurotic; (b) the learning disabled children as a group also manifest more conduct problem behaviors than they do immature or neurotic behaviors (both of the latter dimensions are perceived as being present to the same degree); and (c) teachers of regular classes perceive either fewer problems and/or problems of less severity than do teachers of the other two groups. These problem behaviors are distributed relatively evenly over the three factors.

The findings have implications for the educational management of emotionally disturbed and learning disabled children:

1. Ratings of the child's problem behavior may be one additional criterion to be considered in diagnosis and placement of these children. The more problems present and/or the greater the degree of severity, the more likely it is that the child's behavior resembles that of the emotionally disturbed group.

2. Since the main behavior problem present in both groups, although at different levels, is conduct-problem behavior, provisions should be made to deal with acting-out behavior, overt-aggressiveness, hostility, negativism, and hyperactivity in classes of both emotionally disturbed and learning disabled children. Such provisions as a crisis room or teacher's aide to help with the management of unsocialized aggression may well be considered in planning such programs.

3. The second-order behavior problem for the typical emotionally disturbed child appears to be one of immaturity, inadequacy, withdrawal, inattentiveness, dislike for school, etc. The third order problem is one of neuroticism, self-consciousness, lack of self-confidence, fearfulness, depression, etc. For the learning disability group, both immaturity-inadequacy and neuroticism are of equal importance. Therefore, in establishing priorities in terms of time, resources, or methods in dealing with behavior problems of these children, immaturity will have a higher priority than neuroticism in emotionally disturbed children, but the same priority in learning disabled children.

It should be noted that the results of this study refer to the typical emotionally disturbed, learning disabled, or average child. Not every child in the groups fits such a stereotype. The dispersions of the ratings indicate the variations among the children within a group and the overlap of children between groups. Therefore,

caution should be exercised in translating the group statistics to the individual child. Further, in view of the differing philosophies and definitions in establishing classes for emotionally disturbed and learning disabled children across the country, the generalizability of these results to other school systems would depend on the comparability of the criteria used in the selection of the children for placement in the classes. Finally, it should be born in mind that the present study dealt only with teachers' and mothers' perceptions of the problem behavior of these children. A complete mapping of the areas of communality and uniqueness of the emotionally disturbed and learning disabled children must wait until information on educational, psychological, physiological, and social characteristics of these children has been secured.

Can these behaviors be modified as a result of a special program of remediation of the learning disability? Since the learning problems of these children are often secondary to the management problems, this may be a most important question. The data are difficult to interpret and even more difficult to relate to real life situations in the schools. In essence, the data seem to say that teachers saw little change in the children's social behaviors, and what change was seen was negative. The children became more acting-out. This seems to say that the better the child was able to function academically, the more aggressive was his behavior. This cannot be corroborated by observation or commonsense. It may be that the teacher had not had a chance to know the child on the pretesting and was able to view his behavior with more equanimity than at the end of the year. Perhaps the children did become restless and less controlled as the year progressed. Behavior at home, as rated by the mothers, did improve. The children were perceived as less disruptive, more sensitive and alert, and less immature. Additional evidence of behavioral change is given by the fact that both mothers and teachers rated the child as being closer to their ideal after nine months of remediation.

Summary

What are the behavior patterns of children with specific learning disabilities? Are these personality patterns different from those of emotionally disturbed or normal children? Can these characteristic social behaviors be modified as a result of a special program of remediation of the learning disability? These are the questions to which this section of a larger study of programming for children with specific learning disabilities addressed itself.

As specific learning disabilities has continued to develop as a significant new concept in special education, confusion has developed over the existence or nonexistence of patterns of behavior which characterize these children. The early work of

Strauss and Lehtiner. (1947) emphasized such behaviors as hyperactivity, distractibility, and impulsivity, as being characteristic of their population of brain-injured children. As recently as 1966, when Task Force I addressed itself to the characteristics of children with minimal brain dysfunction (Clements, 1966), it was found that relatively little had been done to study the behavior of new groups of chilren. In reviewing over 100 recent publications, Clements compiled a list of 99 signs and symptoms which were said to be characteristic of these children. However, the extensive list did not describe a pattern of behavior characteristic of children with specific learning disabilities, but rather emphasized the wide variety of behaviors which had been ascribed to individual children who comprise this amorphous group. Werry (1968) called into question the existence of a minimal brain dysfunction syndrome and suggested that these children exhibit behaviors which vary widely from child to child. These opposing contentions relate to the problem of classifying children rather than assessing them. Classification suggests uniformity in the group; assessment emphasizes the individual differences in each child.

The purpose of this aspect of the project was to provide factual data about the behaviors of a group of children who had been diagnosed as having specific learning disabilities, to compare them to other groups of children with whom they have been confused, and to determine the effects of remediation programs on these social behaviors.

Organization of the Study

In the present study, data were collected about the social behaviors of 36 children between the ages of 6 and 13, of normal intelligence, in grades one to seven, who had been diagnosed as having specific learning disabilities. The subjects were enrolled in a remediation program involving regular class placement plus individual or small group treatment by itinerant learning disability teachers.

Teachers' and mothers' ratings of the child's behavior on the Behavior Problem Checklist and the Q-Sort Behavior Analysis Test were obtained. The checklist includes 58 items representing most of the common problem behaviors of children referred to a child guidance clinic. The rater indicates on a three-point scale whether each problem behavior listed constitutes no problem, a mild problem, or a severe problem as far as the child is concerned. Factor analysis of the item intercorrelations has consistently shown that three basic dimensions underlie the behavior domain sampled by the checklist. These three dimensions have been labeled as (a) Unsocialized Aggression; (b) Immaturity-Inadequacy; and (c) Personality Problem.

Factor scores were computed for each subject by linear combination of the ratings weighted by the factor loadings reported by Quay, Morse and Cutler (1966). McCarthy and Paraskevopoulos in an unpublished study found a high degree of similarity between the factorial structure of the ratings of emotionally disturbed, learning disabled and average children.

The Q-Sort Behavior Analysis Test is composed of 50 cards with statements describing discrete social behaviors. The cards are sorted on a distribution board to indicate the applicability of the item to the child's behavior. A quantitative score is assigned to the rating which can be analyzed statistically. This instrument was then factor analyzed, utilizing the techniques described above.

Means, standard deviations, and intercorrelations among the factor scores for each group were computed. Two-way analysis of variance with repeated measures (Groups x Factors design) was used to analyze the factor scores (Edwards, 1965). Scheffe's (1953) method of multiple comparisons was used to test the various contrasts for significance.

Results. The results of the study can be summarized under the following headings:

1. Factor Analysis of Q-BAT with learning disabled children;

2. Factor Analysis of the Behavior Problem Checklist with learning disabled children;

3. A Comparison of the Behavior of Normal, Emotionally Disturbed, and Learning Disabled Children;

4. The Effects of Remediation upon the Behavior Patterns.

1. Factor Analysis of Q-Sort Behavior Analysis Test. Two hundred thirty-one ratings by mothers and teachers of the behavior of 36 children were factor analyzed and yielded four factors tentatively labeled as follows:

| | |
|---|---|
| Factor I | Conformity-Cooperativeness |
| Factor II | Disruptive Conduct-Problem |
| Factor III | Sensitivity-Alertness |
| Factor IV | Immature-Hypotonic |

Teacher-mother reliability was low except for Factor I. Nine-month stability (before and after remediation) was relatively high for the mothers and consistently low for the teachers except on Factor I.

At the beginning of the year, both mothers and teachers perceived the child's behavior as more disruptive, less alert, and more immature than cooperative. After nine months of remediation, teachers ranked the four factor areas as they did in the beginning of the year. Mothers, however, saw significant improvements in the four areas. Both before and after remediation, teachers perceived the child's behavior as more disruptive, less alert, more immature, than the mothers did. They also rated the child as being more cooperative than the mothers did.

2. Factor Analysis of Behavior Problem Checklist. The analysis of 131 ratings yielded the same three factors as found by Quay, Morse and Cutler (1966):

| | |
|---|---|
| Factor I | Unsocialized Aggression |
| Factor II | Immaturity |
| Factor III | Neuroticism |

The proposed schema of three factors to describe children's behavior appears to be generalizable to children with learning disabilities. The agreement between teachers' and mothers' ratings was relatively low. However, both teachers' and mothers' ratings showed little change after the year of remediation.

3. A Comparison of the Behaviors of Normal, Emotionally Disturbed, and Learning Disabled Children. Teachers' ratings on the Behavior Problem Checklist were obtained for 36 children with specific learning disabilities, 41 average children, and 100 children in special classes for the emotionally disturbed. Linear combinations of the raw scores weighted by the rotated factor loadings have been analyzed with the following results:

a. Mean differences for the three groups across the three factors are significantly different. Teachers rate the subjects in the three groups differently.

b. Conduct-problem behavior appears to be the main characteristic of both emotionally disturbed and learning disabled children.

4. Effects of Remediation on the Behavior Patterns. The effects of remediation upon the behavior ratings on both the Behavior Problem Checklist and the Q-BAT were analyzed with the following results:

a. Teachers saw little change in the child's behavior after a year of remediation, except on the conduct-problem dimension which was higher on the posttreatment rating.

b. Mothers' ratings reflected some improvement in the child's behavior in all areas except conduct-problem behavior.

c. Mothers perceived the children to be less disruptive, more sensitive and alert, and less immature after nine months of remediation as ranked on the Q-BAT.

d. Teachers perceived two-thirds of the children to be closer to their ideal child at the end of the project. The other one-third either did not change, or moved further from the ideal of the teacher.

e. Mothers perceived all but one of the children to be closer to their ideal child after the remediation.

Implications of Findings for Service Programs

The results of the factor analytic studies, the comparison of the behaviors of learning disabled, emotionally disturbed, and normal children, and the study of the effects of remediation on behavior patterns leads to some important implications for programs for children with learning disabilities.

Factor Analytic Studies of Behavior Problem Checklist and Q-BAT. The proposed schema of three factors to describe children's behavior appears to be generalizable to children with learning disabilities. The behavior problems of children with learning disabilities can be discussed more succinctly and understood more clearly within this three-dimensional framework. These dimensions appear to provide a more useful way of looking at problem behaviors than the extensive lists of signs and symptoms which have been proposed. This concept seems to have more utility than the labeling or categorizing which has been the practice.

The Q-BAT appears to be an interesting device for collecting information about children's behavior in a quantifiable way. Because two of the factors are positive behaviors, and two negative, statistical interpretation becomes hazardous. Clinically it seems to be a worthwhile device; statistically, it will require caution.

Comparison of the Behaviors of Learning Disabled, Emotionally Disturbed, and Normal Children. The data confirm the clinical intuition of professional workers whose responsibility it is to differentiate and place emotionally disturbed and learning disabled children. The communalities between the behaviors of the two groups make such a differentiation of doubtful validity. The profiles of the two groups of children differ only in level, not in shape. The behavioral differences appear to be quantitative, rather than qualitative.

The ratings on the Behavior Problem Checklist may be one additional criterion to be considered in the diagnosis and placement of these

children. The more problems present, and/or the greater the degree of severity, the more likely it is that the child's behavior resembles that of the emotionally disturbed group.

Since the main behavior problem present in both groups, although at different levels, is conduct-problem behavior, provisions should be made to deal with acting-out behavior, overt aggressiveness, hostility, and hyperactivity in classes for both emotionally disturbed and learning disabled children. Such provisions as a crisis room, study carrels, or teacher's aide to help with the management of unsocialized aggression may well be considered in planning such programs.

The second-order behavior problems for the learning disabled are immaturity-inadequacy and neuroticism. In establishing priorities in terms of time, resources, methods, and criteria, provisions will need to be made to meet the needs of all three types of behavior, the immature, the neurotic, as well as the aggressive.

Of major importance, the dispersions of the ratings indicate wide variations among the children within each group and an overlap of children between the groups. Caution needs to be exercised in translating these group statistics to an individual child. These children seem to be idiosyncratic unto themselves, behaviorally as well as cognitively.

In view of the differing philosophies and definitions used in establishing classes for emotionally disturbed and learning disabled children across the country, the generalizability of these results to other school systems would depend on the comparability of the criteria used in the selection of the children for placement in the programs.

It should be borne in mind that the present study dealt only with mothers' and teachers' perceptions of the problem behavior of these children. A complete mapping of the areas of communality and uniqueness of the emotionally disturbed, learning disabled, and normal children must wait until information on the educational, psychological, physiological, and social characteristics of the children has been secured.

The Effects of Remediation on the Behavior Patterns. There appears to be a significant discrepancy between the perceptions of the mothers and the teachers, both before and after remediation. This low agreement may result from the fact that the mothers and the teachers perceived the child in different environmental situations and in different role relationships. It may also reflect the fact that children behave differently at home than they do at school. The

awareness of this discrepancy in perception should be an important component of every parent-teacher conference. If the teacher can be acutely aware of the fact that the mother may see the child quite differently, whether realistically or not, the conference can be structured in such a way that hostility can be avoided or reduced.

Apparently teachers do not see behavioral changes after a remediation period, whereas mothers do. Teachers rate children as more acting-out on the posttreatment data than they did on the pretreatment ratings. This finding, if valid, casts doubt on the assumption that negative behaviors are responses to frustration and failure, and that behavior will improve as the child becomes more competent in academic learning. However, the finding may reflect a reduced tolerance on the part of the teacher as the year draws to a close. It may also reflect an increase in acting-out behavior on the part of the children. It may also reflect antipathy on the part of the teachers toward specialized attention being paid to "trouble-makers". In any case, awareness on the part of special educators of the perceptions of the regular class teachers may suggest that public relations work needs to be done, especially in the spring. It also suggests that increased efforts and enthusiasm need to be engendered in the spring to counteract the end-of-the-year slump.

The fact that both mothers and teachers perceived the child as being closer to their ideal child is a positive factor that can be emphasized in both parent conferences and conferences with the classroom teacher. It may be an opportunity for emphasizing positive behavioral changes and de-emphasizing negative changes.

The delineation of behavioral patterns among this group of handicapped children continues to need systematic research with new groups of children. A complete mapping of the areas of communality and uniqueness of this group and other related groups of children needs to be explored. If there are clusters of behavior which form recognizable clinical entities in this group of children, additional data to support this hypothesis is needed. The most important finding of this study would support the view that these children are idiosyncratic unto themselves, behaviorally as well as cognitively.

## CHAPTER VII

### Case Studies

The data gathered during the course of this study, and presented thus far, has been concerned with groups of children, and analyzed largely by parametric statistical methods. However, on most variables studied, the size of the variances has indicated that children with specific learning disabilities form a heterogeneous group, and may be quite unlike each other, just as many of them may be quite unlike the mean for the group. The statistical technique which was described in Chapter IV (Hierarchical Grouping) was an attempt to compare a series of profiles over a series of variables, and to progressively associate them into groups or clusters. Even with the use of this clustering technique, it became apparent that the application of the general scientific method to the problem of children with specific learning disabilities may have served to obscure some of the important hypotheses which may be advanced as the result of intensive study of a particular case. Thus, it seemed fruitful to apply nomothetic methods to several cases from which tentative generalizations or hypotheses have been drawn which have been confirmed by the data derived from other cases. The cases were also selected to illustrate the heterogeneity evident in groups of children with specific learning disabilities.

The following tentative generalizations have been deduced from these cases:

1. Efficacy studies which have studied changes within groups of learning disabled children using parametric procedures, have ignored the heterogeneity of the subjects and the non-normal distribution of the variables. Significant changes can be elicited in specific children with specialized teaching techniques;
2. Among the mentally retarded population are some children whose retardation is remediable, and who might better be classified and taught as children with specific learning disabilities;
3. Children can be identified in kindergarten and effective remediation provided in a class of 12-15 other learning disabled children;
4. Children who have been medically diagnosed as aphasics can be taught successfully in the public schools, using remediation techniques similar to those employed with other children with specific learning disabilities;
5. Some of the studies of the efficacy of remediation have not been longitudinal in nature, and have missed significant changes which may not occur after only one year of remediation;
6. Although the "Strauss syndrome" or hyperkinesis may be present in some children with specific learning disabilities, language delay or disturbance is a more common symptom in these children;
7. As is true with other groups of handicapped children, short-term memory deficits are the most common disability found in these children and the most difficult to remediate.

In the case studies, the criteria suggested by Kirk (1966) have been followed in determining the existence and the extent of the disability:

1. "In terms of age scores there should be a discrepancy of at least three years between the high and low points on the profile."
2. "One can also determine the discrepancy by using a reference line of total language age and determining a special ability as one which is 1½ years above the total language age, or a disability as one which is 1½ years or more below the total language age."
3. A psycholinguistic quotient below 80 has also been suggested (Kirk and Paraskevopoulos, 1969) as a criterion for determining the existence of a disability.

Each case study presents the following:

A Synopsis,
Early development and medical background,
The school history,
Pre-remediation assessment,
Remediation,
Results of remediation, and a
Chart summarizing the data.

The three cases selected include:

Case 1: Mark - A case of mental retardation in a six year old boy, with specific learning disabilities in the areas of auditory-vocal association, and both vocal and motor encoding.

Case 2: Robert - A case of receptive and expressive aphasia in a hyperactive five year old boy.

Case 3: Clyde - A case of a hyperactive first grade boy with auditory decoding deficits which appeared to be interfering with his ability to learn in school.

Case I Mark

A case of mental retardation in a six year old boy, with specific learning disabilities in the areas of auditory-vocal association, vocal and motor encoding.

I. Synopsis

This is a case of a boy who was described by his kindergarten teacher as a very nervous child. He would shake whenever he was called upon, become confused, and be unable to answer simple questions. When asked to underline something in his book, he would look blankly at his teacher and appear not to understand what he had been asked to do. Although originally classified as retarded, his intellectual functioning improved in response to remediation until he tested out of the retarded range into the dull-normal range.

After four years of intensive remediation, Mark is functioning at grade level in all academic areas. His psycholinguistic quotient has increased from 68 to 90 and his IQ from 65 to 87. He will be returning to his neighborhood school, assigned to a warm, structured teacher who can provide a well organized, sequential program in fourth grade.

II. Early Development and Medical Background

Mark is the fourth of five boys, ranging from 6½ years older to 4 years younger than Mark. His birth was reported to have been normal; he weighed nine pounds and color was good. Motor development was within normal limits; he sat at six months, and walked at one year. Although he babbled normally, speech was somewhat delayed, with sentences not being used until he was three years old. He had some articulation problems when he entered first grade. According to his mother, Mark's problems are similar to those of his older brothers, although school records indicated they were good students. Mark occasionally rocked in his crib until he fell asleep. He has had few illnesses, with no apparent problems except enlarged adenoids. Mark's parents were referred to a pediatric neurologist primarily because of the shaking and nervousness reported by the mother and teacher. Neurological examination was entirely normal. There were no localizing neurologic findings that might suggest brain damage. An electroencephalogram disclosed minimal biparietal spike seizure activity with suggestive 14 and 6 per second activity as well. The neurological summary stated: "In view of the absence of such symptoms as headache, abdominal pains, or syncopal episodes, it was my feeling that no specific treatment was required on the basis of the minimal changes in the electroencephalogram. I therefore tried to reassure the parents and suggested that they continue with special instruction at school." Although the shaking was brought to his attention, the neurologist did not feel that medication was necessary.

III. School History

Mark entered the summer kindergarten at Hoffman School when he was five years, eleven months old. Mrs. Kramer, Mark's summer kindergarten teacher, described him as a child who "shook when approached, couldn't answer simple questions, couldn't differentiate between same and different, with a short attention span". Mark was happy and contented when not under pressure to do or carry out specific directions. He seemed to have a speech problem, particularly in articulation. Mark generally appeared easily irritated, uneasy, and seldom alert. He was unwilling to assume responsibility and uninterested as well as unready for kindergarten materials. He was not, however, a behavior problem.

Observed on October 10, 1965, in the first grade classroom, Mark did not seem to belong in the class. He was unable to write his name or to read simple labels in the room. Playground behavior showed little socialization ability. He ran in an aimless, floppy way indicating some problems in coordination. He could not follow directions in the room nor differentiate between same and different. He was rather quiet and not spontaneous in speech or actions.

Mark did not know his colors, and could not trace letters or pictures correctly. He had no correspondence in counting, and could only recognize the numberal "1". He could do very little on his own other than coloring. Form copying skills were at the three year level. He scored at the 7th percertile on the Metropolitan Reading Readiness Test.

Mark was tested by the school psychologist and the psychoeducational diagnostician at the beginning of the first grade year. On the basis of this pre-remediation testing, Mark was placed in the itinerant learning disabilities program, and also on the waiting list for the preprimary EMH class, since he was found to be eligible for such placement. Because of pecularities in his test performance, it was felt that a year in a regular first grade, with remediation for one half hour per day by the psychoeducational diagnostician would give a period of observation to see if maturation, social development and remediation might not produce changes in his total functioning.

He was retained in first grade, but has been promoted every year since, and has been in the primary learning disabilities resource room program during first, second, and third grades. During second grade, he spent most of the morning in the resource room with a group of second graders. When he was in third grade, he spent one hour a day in the resource room during the time his class had reading.

Mark was also seen regularly by the speech therapist during first and second grade for articulation therapy.

Mark has improved in all areas to the point where he is able to keep up with the work of his own grade. He has been placed in a regular fourth

grade in his home school where he can continue to be served in the itinerant learning disabilities program until it has been determined that he will be able to succeed without further help.

IV. Pre-remediation Diagnosis

Psychometric and Psycholinguistic Test Data. Initial psychometric test results obtained when Mark was six years old are presented below and in Table 40.

| | | |
|---|---|---|
| Stanford-Binet Intelligence Scale | Chronological Age | 6-1 |
| | Mental Age | 4-2 |
| | Intelligence Quotient | 65 |
| Illinois Test of Psycholinguistic Abilities | Chronological Age | 6-1 |
| | Total Language Age | 4-4 |
| | Psycholinguistic Quotient | 71 |
| Frostig Tests of Visual Perception | | 4-3 |
| Eye-Motor Coordination | | 4-3 |
| Figure Ground | | 2-6 |
| Form Constancy | | 5-6 |
| Position in Space | | 4-0 |
| Spatial Relations | | 4-9 |
| Perceptual Quotient | | 73 |
| Beery-Buktenica Visual Motor Integration Test | | |
| Age Equivalent | | 4-4 |

Mark was a pleasant-looking, motorically awkward six year old who was functioning below his chronological age in all areas measured. The mental age of 4-4. His range of functioning on the ITPA, from 2-10 to 5-9, was comparable to his range on the Binet where a basal had been established at 3 and a ceiling at 7. Similar age scores on the Frostig and the VMI gave further substantiation to the findings. The intelligence quotient of 65, the psycholinguistic quotient of 71, and the perceptual quotient of 73 further confirmed the daignosis of mental retardation.

However, the clinical judgement of the psychologist argued against this diagnosis. There was a 35 month spread on the ITPA between highest and lowest subtest scores, as well as standard score discrepancies of -3.00, suggesting the kind of profile found in children with specific learning disabilities.

The pre-remediation diagnosis was: mental retardation with specific learning disabilities in the areas of auditory vocal association, vocal and motor encoding. The auditory deficits were considered primary, and

Mark

Table 40

| | Pretest 10-65 C.A. 6-1 | Post Test 1 6-66 C.A. 6-9 | Post Test 2 6-67 C.A. 7-9 | Post Test 3 9-67 C.A. 8-1 | Post Test 4 5-68 C.A. 8-9 | Post Test 5 2-69 C.A. 9-5 | Post Test 6-69 C.A. 9-9 |
|---|---|---|---|---|---|---|---|
| Stanford-Binet I.Q. | 65 | 77 | 87 | | | 81 | |
| M.A. | 4-2 | 5-4 | 6-10 | | | 7-10 | |
| ITPA | | | | | | | |
| Auditory Decoding | 4-7 | 4-5 | 4-9 | 7-6 | | | AN (8-10 |
| Visual Decoding | 4-9 | 3-8 | 5-10 | 4-9 | | | 7-10 |
| Auditory-Vocal Association | 3-6 | 5-6 | 6-1 | 6-6 | | | 8-3 |
| Visual-Motor Association | 5-1 | 2-11 | 5-5 | 3-8 | | | 8-3 |
| Vocal Encl ding | 2-10 | 5-4 | 5-4 | 6-0 | | | AN (8-11 |
| Motor Encl ding | 3-2 | 3-6 | 5-5 | 8-8 | | | 6-10 |
| Auditory-Vocal Automatic | 5-9 | 5-4 | 6-1 | 6-10 | | | 6-10 |
| Auditory-Vocal Sequencing | 4-4 | 5-1 | 5-4 | 5-4 | | | 6-7 |
| Visual-Motor Sequencing | 4-10 | 5-4 | 5-1 | 6-0 | | | AN (9-0) |
| Total Language Age | 4-4 | 4-8 | 5-5 | 6-0 | | | 8-10 |
| Psycholinguistic Quotient | .71 | .68 | .72 | .74 | | | At least 90 |
| Frostig | | | | | | | |
| Eye-Motor Coordination | 4-3 | 5-3 | | | | | |
| Figure Ground | 2-6 | 5-0 | | | | | |
| Form Constancy | 5-6 | 6-9 | | | | | |
| Position in Space | 4-0 | 6-3 | | | | | |
| Spatial Relations | 4-9 | 4-9 | | | | | |
| Perceptual Quotient | 73 | | | | | | |

-123-

remediation was aimed at these functions. The Frostig program was also used to remediate deficits in visual perception.

V. Remediation

The psychoeducational diagnostician and the speech correctionist cooperatively planned the program of remediation for Mark, with the latter working primarily in the auditory areas, and on language development, and the diagnostician working on motor and visual functions. Both specialists worked closely with the first grade teacher so that parts of the remediation program could be carried out in the first grade classroom.

The program of remediation is summarized below:

A. Visual Perception

1. Since even the simplest parts of the Frostig program were too difficult for Mark, some pre-publication sheets of the Beginning Pictures and Patterns were used. As soon as Mark could succeed with the regular Frostig sheets, the directions were taped by the diagnostician for his use in the classroom together with a headset. The classroom teacher took over this part of the remediation program.
2. The easiest parts of the Continental Press materials in visual perception were used to supplement the Frostig program.
3. Mark traced large geometric figures on the blackboard.
4. He practiced rhythmic writing on the board.
5. He traced inside large cardboard shapes and then cut them out.

B. Motor Encoding

Fine motor coordination deficits seemed to play an important part in Mark's poor performance on the motor encoding tasks, as well as in cutting, pasting, coloring, or writing. Remediation initially was aimed at improving fine motor coordination.

1. Mark practiced catching a bean bag, first very close using two hands, then only the left, and then the right hand. The distance was gradually increased.
2. Using a large ball, the teacher bounced it once, gradually increasing the distance as Mark became more proficient in catching it.
3. The same procedure was followed, using a small ball.
4. Mark was taught finger plays which he illustrated with finger and hand movements.
5. He played "Simon Says", first with auditory and visual cues and then just visual cues in which he imitated the teacher's movements.
6. Gradually emphasis was transferred to large muscle activities both in school and at home.
7. Since laterality had not yet been established, exercises to develop left-right concepts were introduced into all activities whenever possible.

C. Vocal Encoding

1. A language program based on the work of Engelmann and Bereiter (1966) was utilized extensively. This involved work on singular and plural forms of nouns, opposites, etc.

2. The Language Master program was gradually introduced, beginning with nouns, verbs, prepositions, and proceeding to phrases and sentences.

3. Mark was taught to respond with full sentences, rather than one word.

4. After much practice with simple labelling of objects and pictures, using mostly nouns, emphasis was placed on action pictures in order to extend the length of the verbal descriptions.

D. Academic Areas

1. Supplementary teaching was provided in reading to reinforce the work of the classroom teacher who was using the Scott Foresman Reading program.

2. The Fernald Method which utilizes a multisensory approach to reading was employed. Mark made his own flash cards, traced and sounded out the words, shut his eyes and visualized the word, and then read it aloud.

3. The Kittle handwriting program was used extensively.

VI. Results of Remediation

At the end of the first year, improvement was noted in intellectual functioning, social behavior, and academic functioning. Specific gains were noted on the Stanford Binet (Table 40) with an increase in the IQ of 12 points, from 65 to 77, with a M.A. of 5-4. The improvement was most notable in those tasks requiring general comprehension, judgement and reasoning, vocabulary and verbal fluency, and arithmetic reasoning. Particularly notable were the improvements seen in visual motor abilities on such items as copying a square, and picture completion. On a less immediately recognizable level, Mark improved in terms of his ability to supply structure on the completion of the man at the five year level. The program of remediation with the Frostig materials was most directly related to this type of task. Laterality had not yet been established.

The deficits in auditory-vocal association continued to be evident on the opposite analogies subtest of the Binet. The psychologist recommended that remedial efforts be focussed on the association process. Post test I (Table 40) on the ITPA showed some specific changes. The psycholinguistic quotient had not changed significantly (from 71 to 68). Total language ago had increased from 4-4 to 4-8. However, there was an interesting reversal with some subtests which had been relatively high going down, and some that had been low going up. For example, visual decoding went down 13 months and visual motor association went down 26 months. At the same time, auditory-vocal association went up 24 months, vocal encoding went up 30 months, and auditory-vocal sequencing went up 9 months.

Dramatic changes were seen on the Frostig, ranging from 12 months in eye-motor coordination to 30 months on the figure ground subtest. There was no change on the spatial relations subtest.

Improvements in social behavior were also noted in the classroom. He showed increased maturity, responding more adequately and appropriately to teacher directions as well as to relationships with his classmates.

At the end of the first grade, he was reading in the third preprimer in the lowest reading group. Mark recognized all letters and was beginning to develop sound-symbol associations. It was recommended that he repeat first grade, and be placed in the learning disabilities resource room program.

During his second year in first grade, Mark was seen one period per day by the resource room teacher. She concentrated primarily on visual-motor areas which had been shown to be deficits in the post test profiles: visual decoding, visual-motor association, and motor encoding, but with some emphasis on total psycholinguistic development. Mark continued to be seen by the speech correctionist in a program of language development.

A. General Psycholinguistic Development

The exercises included in J. O. Smith's monograph from Peabody College (1962) were utilized on a daily basis as a developmental language program.

1. Visual-Motor Association

a. The reading readiness program of Continental Press was utilized in addition to be above exercises.

b. Mark chose a concept such as animals, and cut pictures from magazines of examples of animals, transportation, sports, etc.

c. The Peabody Picture Vocabulary Cards were used as a teacher device.

d. Mark's mother was encouraged to assign sorting tasks to him at home. He sorted canned goods into fruits, vegetables, meats, etc. He sorted silverware before putting it away. He sorted socks for color, ownership, size, etc.

2. Motor Encoding

a. The series of games utilized by Genevieve Painter (1965) in her research at the University of Illinois were systematically presented.

b. A walking board was constructed and exercises were included in Mark's P.E. program twice a week.

c. Charades were introduced at a very simple level and gradually

were made more complex as Mark's abilities increased.

d. Work on Kephart-type exercises was continued.

3. Academics

a. The Behavioral Research Laboratories Programmed reading series was introduced to supplement the reading program in the classroom.

b. The Kittle Handwriting program was continued.

c. The Engelmann-Bereiter language program was continued emphasizing categories, prepositions and simple problem solving.

At the end of his second year in first grade, Mark was performing academically at grade level in all subjects. Significant changes were noted in intelligence functioning and psycholinguistic development. (Table 40) His IQ increased from 77 to 87, his M.A. from 5-4 to 6-10. Total language age on the ITPA increased from 4-8 to 5-5. His psycholinguistic quotient increased from 68 to 72. Specific sub-test gains included 26 months on visual decoding, 30 months on visual-motor association, and 23 months on motor encoding. In general, the profile appeared to have flattened out, with few discrepancies between sub-tests.

It was recommended that Mark attend the Augustana College Summer Speech Camp to help him maintain the gains in language development which had been seen during the year. He was promoted to second grade and recommended for continued placement in the learning disabilities program.

When Mark was in second grade he spent almost the entire morning (2½ hours) in the resource room with a group of second graders. The program consisted of a structured language program, a systematic reading program and an arithmetic program which followed the second grade text. The sessions were always scheduled during the reading period and the resource teacher gave the reading, language and arithmetic grades.

When Mark was in third grade, he spent an hour a day in the resource room during the time his class had reading. Emphasis was on the development of comprehension skills.

Following third grade, Mark was returned to his base school for fourth grade with supportive help in concept development by the psychoeducational diagnostician for two ½ hour sessions per week.

Detailed results on the Illinois Test of Psycholinguistic Abilities (Experimental Edition) were as follows:

| | 10-65<br>CA:6-1 | 9-27-67<br>CA:8-1 | 5-26-69<br>CA:9-9 |
|---|---|---|---|
| Auditory decoding | 4-7 | 7-6 | AN(8-10) |
| Visual decoding | 4-9 | 4-9 | 7-10 |
| Auditory-vocal association | 3-6 | 6-6 | 8-3 |
| Visual-motor association | 5-1 | 3-8 | 8-3 |
| Vocal encoding | 2-10 | 6-0 | AN(8-11) |
| Motor encoding | 3-2 | 8-8 | 6-10 |
| Auditory-vocal automatic | 5-9 | 6-10 | 6-10 |
| Auditory-vocal sequencing | 4-4 | 5-4 | 6-7 |
| Visual-motor sequencing | 4-10 | 6-0 | AN(9-0) |
| Total Language Age | 4-4 | 6-0 | 8-10 |
| Psycholinguistic Quotient | 71 | 74 | 90 |

Wide Range Achievement Test results were:

| | |
|---|---|
| Reading Grade | 3.3 |
| Spelling Grade | 3.0 |
| Arithmetic Grade | 2.2 |

Mark achieved the following on the Stanford Binet:

| | 10-65<br>C.A.6-1 | 2-69<br>C.A.9-5 |
|---|---|---|
| I.Q. | 65 | 81 |
| M.A. | 4-2 | 7-10 |

A summary of pre- and post-test scores on Mark are as follows:

Stanford Binet

| | | | |
|---|---|---|---|
| CA | 6-1 | 7-9 | 9-5 |
| MA | 4-2 | 6-10 | 7-10 |
| IQ | 65 | 87 | 81 |

ITPA

| | | | |
|---|---|---|---|
| CA | 6-1 | 7-9 | 9-9 |
| PLA | 4-4 | 5-5 | 8-10 |
| PQ | 71 | 72 | 90 |

Wide Range Achievement

| | | | |
|---|---|---|---|
| CA | - | - | 9-9 |
| Reading Grade | - | - | 3.3 |
| Spelling Grade | - | - | 3.0 |
| Arithmetic Grade | - | - | 2.2 |

It will be seen from these results that Mark has made significant acceleration in intellectual and psycholinguistic scores, and is at the age of 9-9 scoring second and third in academic subjects. Although classified as mentally retarded during his first two years of school, he can, on the basis of his intellectual psycholinguistics, and academic achievement, no longer fit into the category of mental retardation.

Case 2 Robert

A case of receptive and expressive aphasia in a hyperactive five year old boy.

I. Synopsis

Robert was first diagnosed as "having a receptive language problem, probably as a result of a central nervous disturbance" when he was three and a half years old. His parents had taken him to the Institute for Language Disorders at Northwestern University because of his failure to develop normal language and speech.

He began a tutoring program when he was four years old, and continued once each week for two years. The emphasis of the work was on the development of receptive and expressive language. However, as other problems in visual analysis and synthesis or in visual coordination were noted, the plan of remediation was broadened. At the time that he enrolled in first grade in Schaumburg, Northwestern University reported multiple areas of disability, both in auditory-vocal and visual-motor. He was placed in the itinerant learning disabilities program for two years, and then in the resource room program for two years, and then in the resource room program for one year. During this time he was also seen three times a week for three years by the speech correctionist. He also was placed in the summer speech program.

Robert is now ready to return to a regular third grade class. He is able to do grade level work, but will need some supervision by the learning disabilities teacher in order to strengthen his self-control and increase his self-confidence.

II. Early Development and Medical Background

The mother lost her first child, who was born after a 6 month pregnancy and lived only 10 days. His sister's birth was apparently normal, but the mother had a miscarriage before Robert was born. The mother was 33 years old at Robert's birth. She was given gas during her 6 hour labor, and he was born with instruments. It was a breach presentation, and he was "black and blue" at birth, did not breathe easily, and needed an incubator and oxygen for 14 hours. She further describes that his legs were "up like a frog" for about a week. He weighed 6 pounds, 11 ounces at birth and did not require further medical attention after being released from the incubator.

He is reported to have sat in a chair at 7 months, crawled at 10 months, and walked just before 15 months. He babbled normally and started saying individual words such as da-da, at 8 months. He started speaking in sentences, although very unclearly, when he was 4 or 5 years old. His articulation has always been extremely poor and he continues to have trouble with his speech. Bowel training began at 2 years; however, he wet his bed every night and

soiled at home until he was 7. The mother reported that when Robert was corrected or scolded he would crawl under the furniture and scrape his head. He had the usual childhood diseases with no known after effects.

The family physician recommended that the parents take him to the Northwestern University Institute for Language Disorders.

Presently, he is under the care of an ophthalmologist for a muscle problem in his eye. Also, he had been given a mild sedative to be taken for one month, in the hope that this would somehow quiet him and diminish the "nervous spells" which the parents complained about. Robert often appears to be over-tired.

III. School History

Robert attended the local public kindergarten session in the summer of 1966. His teacher described his behavior as immature and inadequate with the other children. His emotional adjustment was very poor in coping with the problems of daily living in school. His skills in regard to social responsibilities in school were poor, as was his stability in regards to sudden or marked changes of mood. He made frequent overt manifestations of hostility toward the other children. Occasionally, he showed hostility towards adults. He had a tendency to become emotionally upset, angry and irritable. However, his general mood appeared to be moderately happy, and he had a tendency to be somewhat extroverted in his characteristic manner of expressing emotions. Nevertheless, he seemed to be extremely insecure in regard to the school environment and his classmates.

In summary, he was restless and was not able to sit still for the length of time expected of a kindergarten student. He would become upset when the teacher or the students did not appear to understand him. Although it is reported that he made excellent progress in his expressive language while attending the Institute for Language Disorders, his speech was still so unclear that the teacher could hardly understand him, unless she knew beforehand what he was saying. The kindergarten experience was a frustrating one for Robert and his teacher.

However, when he entered first grade with the same teacher in the fall of 1966, he appeared to have calmed down considerably and to be somewhat more mature in his ability to handle his own difficulty with the teacher and other students.

Although the language problems were still present when he entered first grade, Robert did not appear to become as quickly upset with his inability to communicate as he had during the summer. He devised original methods of getting his ideas across to the teacher and the students when they did not understand his words. Although he had a rather low frustration level he was not as unhappy or upset in school as he was during the summer.

Robert was promoted to second grade, although he had not been able to master all of the work of the first grade. His second grade teacher became quite interested in him, and individualized his program in cooperation with the speech correctionist who saw him three times a week and the psychoeducational diagnostician who worked with him four times a week for forty minutes. His second grade teacher was concerned about his immaturity, his inability to use basic skills and his perception of himself. She reported that he had temper tantrums, throwing himself on the floor and screaming. Although he had developed basic skills in reading and arithmetic, he did not know how to use them. He was just beginning to use sentences in the classroom. Although he could read reasonably well, the teacher reported that he could not use a workbook appropriately.

At the end of second grade, the numbers and severity of the learning problems remaining made it seem wise to transfer Robert to the learning disability resource room at Lakeview School. Retention in second grade was also recommended, with speech therapy and social work service to be continued.

In September, 1968 Robert was placed in a small, self-contained second grade class in which the teacher could concentrate on the development and practice of skills. The resource teacher found that Robert's behavior needed much improvement; he demanded a great deal of attention, and often refused to follow instructions. His parents were concerned about the effectiveness of his medication and were actively seeking a different physician.

The resource room was not located in the elementary school near Robert's home, so it was necessary for him to take the bus. This precipitated some problems at first when Robert would not behave properly, or did not complete his schoolwork. However, as the school year progressed with the staff behaving in a similar, consistent manner, these problems disappeared.

In November, 1968 Robert was simultaneously given new medication and changed from the tutorial situation in the resource room to one with a small group of second graders. He had a strong desire to be accepted by others, which coupled with the new medication, brought on a radical change in Robert. He was able to wait for his turn for individual attention and he sought others in group activities. He no longer excused his misbehavior or lack of self-control on his medication but began to assume responsibility for his own actions.

As a result of a staff conference, observations, and post-test data, it was recommended that Robert be placed in a third grade class with a structured, well-organized, and firm teacher. He was not able to do grade level work but needed some support service from the resource room program to strengthen his self-control and increase his self-confidence.

IV. Pre-remediation Diagnosis

Robert began in the Northwestern University Institute for Language Disorders during the summer of 1964. Because of the great distance from the Institute, the family arranged to bring him only once each week. Initially the emphasis of work was on the development of Robert's receptive and expressive language. However, whenever other learning problems such as a disturbance in visual analysis and synthesis or in visual coordination were noted, the Institute broadened their plan of remediation. Toward the end of his work at the Institute the emphasis was on language and all areas of school readiness, including pre-reading, writing and arithmetic. Robert made good progress in all aspects of development. He was able to demonstrate average ability for his chronological age level in the Peabody Picture Vocabulary Test and the work meaning section of the Metropolitan Readiness Test. However, in following a series of commands he had some difficulty. It was necessary in these instances for the teacher to re-work her instructions in order to make certain that he understood a task or tasks.

The report from the Institute noted that Robert's expressive language had been somewhat concrete; however, he improved in this area to the point that upon leaving the Institute he was able to relate incidents, tell stories and formulate sentences. He still made errors in syntax and articulation; however, the syntactical disturbance is reflected primarily in his omission of auxiliary verbs, word endings and pronoun substitutions. In addition he did not always word questions properly because he could not remember the order of the words to be used.

Robert's visual perceptual skills were slightly below average. On the matching section of the Reading Readiness Test, Robert showed a tendency to reverse or invert designs, and he failed to note the sequence of letters in a series. This was the area where the Institute felt he would need special attention.

Because of his disturbances in visual analysis and synthesis, as well as in visual motor coordination Robert had problems in forming new letters or designs. After he had learned the motor pattern, however, he did quite well. In the copying section of the Metropolitan Test, he wrote all the letters and numbers correctly, but made errors on the designs which he had not practiced. The Institute believed that this indicates he had a degree of apraxia and that some time should be spent in breaking down the motor patterns into the simplest components and building them up into smoother and more complex patterns.

The Institute expected that Robert would have problems in learning arithmetic skills because of his visual spatial problems and also because of his language difficulties. Although while at the Institute he could identify numbers said by the teacher, he could not write them from dictation. Nor could he answer the problems read to him, because of his auditory memory disturbance.

At the Institute Robert was "easy to manage and always pleasant and cooperative". Because of his size, and perhaps also because of some of his learning difficulties, he is apt to give one the impression that he is younger than he is. The Institute recommended that every attempt be made to encourage his self-help, independence, and general social competence.

On the WISC, Robert achieved the following:

| | |
|---|---|
| Verbal IQ | 103 |
| Performance IQ | 83 |
| Full Scale | 93 |

Results on the Illinois Test of Psycholinguistic Abilities (Experimental Edition) were as follows:

| | 9-66<br>CA:6-5 |
|---|---|
| Auditory decoding | 6-9 |
| Visual decoding | 4-9 |
| Auditory-vocal assocation | 5-6 |
| Visual-motor association | 6-6 |
| Vocal encoding | 2-0 |
| Motor encoding | 6-10 |
| Auditory-vocal automatic | 2-0 |
| Auditory-vocal sequencing | 4-7 |
| Visual-motor sequencing | 5-4 |
| Total language age | 5-4 |
| Psycholinguistic Quotient | 83 |

The age range on the sub-tests of the Illinois Test of Psycholinguistic Abilities was 2-0 to 6-10. Robert was unable to score on vocal encoding and auditory-vocal automatic sub-tests. Weaknesses were in Auditory-vocal sequencing, Visual decoding, Auditory-vocal association, and Visual Motor Sequencing. Strengths were in Motor Encoding and Auditory Decoding.

On the Wide Range Achievement Test, Robert achieved the following grade scores:

| | 9-66<br>CA:6-5 |
|---|---|
| Reading Grade | 1.2 |
| Spelling Grade | 1.2 |
| Arithmetic Grade | 1.5 |

Results on the Frostig were:

| | 9-66<br>CA:6-5 |
|---|---|
| Eye Motor Coordination | 4-6 |
| Figure Ground | 4-9 |
| Form Constancy | 4-6 |
| Position in Space | 7-0 |
| Spatial Relations | 5-0 |
| Perceptual Quotient | 82 |

Therefore, Robert was diagnosed as a child with receptive and expressive aphasia who was functioning in the average range of intelligence and who demonstrated low abilities in visual perception and visual motor areas. Due to his inability to express himself clearly, Robert's frustration level was very low. He was immature, had frequent tantrums, and was hyperactive.

V. Remediation

Remediation was based on a process approach to academics. Initially (first grade) Robert had a fairly good sight vocabulary and the program concentrated on the use of reading skills in written work. However, it was determined that this tutorial program was not appropriate. Robert demanded the attention of whoever was present and very often refused to cooperate in a group. His medication was changed as well as his remediation program. He was changed to a small resource room with a small group of second graders. He responded positively to the group and began to develop some self-control.

At this time Robert began to work in the SRA Reading Lab Ia and in six months, he progressed from a reading level of 1.4 to 2.6. He also worked with Cuisenaire rods on addition, subtraction, and fractions. However, only color names were used, not number values, so there would be a minimum of confusion between the resource room program and the approach in the classroom. Robert was given short tasks and experience in attacking a problem logically and systematically.

The remediation program revolved around reinforcement of classroom activities with remediation activities designed to capitalize on the strengths and remediate the weaknesses. Therefore, with the exception of the SRA reading program and Cuisenaire rods which were used to develop a concrete base for abstract mathematical concepts, visual-decoding and auditory sequencing abilities, the materials used were a part of the regular general educational curriculum.

Behavioral management techniques were utilized. Positive behaviors were praised and/or rewarded and negative behaviors were ignored, if possible. Assignments were short-term initially and were gradually expanded as Robert demonstrated more organizational ability and more self-confidence.

VI. Progress Report

Self-concept and self-control have improved as reported by Robert's teachers. Table 41 summarizes test changes that have occurred during the three years of remediation. He was able to be placed in a third grade class, and to do grade level work.

Robert

Table 41

| | Pretest 9-66 C.A. 65 Gr. Pl. 1 | Post Test 1 5-67 C.A. 7-0 Gr. Pl. 2 | Post Test 2 Gr. Pl. 2 | Post Test 3 9-68 C.A. 8-5 Gr. Pl. 2 | Post Test 4 5-69 C.A. 9-1 Gr. Pl. 2 |
|---|---|---|---|---|---|
| WISC Verbal IQ | 103 | | | | |
| Performance IQ | 83 | | | | |
| Full Scale IQ | 93 | | | | |
| ITPA | | | | | |
| Auditory Decoding | 6-9 | 6-2 | | 7-6 | AN (8-10) |
| Visual Decoding | 4-9 | 4-9 | | 7-10 | AN (8-9) |
| Auditory Vocal Association | 5-6 | 5-10 | | 6-6 | 9-0 |
| Visual-Motor Association | 6-6 | 8-7 | | 7-10 | 7-10 |
| Vocal Encoding | | 7-9 | | AN (8-11) | 7-9 |
| Motor Encoding | 6-10 | 7-11 | | 6-10 | AN (8-8) |
| Auditory-Vocal Automatic | | 6-6 | | 6-6 | 6-1 |
| Auditory-Vocal Sequencing | 4-7 | 5-4 | | 5-1 | 5-11 |
| Visual-Motor Sequencing | 5-4 | 4-4 | | 5-1 | 7-4 |
| Total Language Age | | 6-2 | | 6-10 | 7-9 |
| Psycholinguistic Quotient | 88 | | | | |
| Frostig | | | | | |
| Eye-Motor Coordination | 4-6 | 4-3 | | | |
| Figure Ground | 4-9 | 5-0 | | | |
| Form Constancy | 4-6 | 6-3 | | | |
| Position in Space | 7-0 | 5-6 | | | |
| Spatial Relations | 5-0 | 6-0 | | | |
| Perceptual Quotient | 82 | 76 | | | |
| Wide Range Achievement Test | | | | | |
| Reading | 1.2 | | | | 3-9 |
| Spelling | 1.2 | | | | 3-2 |
| Arithmetic | 1.5 | | | | 3-) |

Case 3 Clyde

A case of a first grade boy with auditory decoding deficits which appeared to be interfering with his ability to learn in school.

I. Synopsis

Clyde was referred by his first grade teacher because of hyperactivity and distractibility. He also had to have directions repeated several times before he began his work. He made very little progress his first year of school. Clyde was seen three times a week for periods of 45 minutes per session by the psychoeducational diagnostician and on a regular basis by the school speech therapist.

After four years of remediation, Clyde is functioning in most areas in the regular academic program. He is attending his base school and is enrolled in the learning disabilities resource room for reading and behavioral management.

II. Early Development and Medical Background

Clyde is the second oldest in a family of 4 boys. His older brother, Michael, is a year older than he is; his younger brother, David is approximately 2 years younger; and his youngest brother, Chris, is approximately 4 years younger. The older brother, Michael, has had some difficulty in his school achievement and behavior, but is presently attending a parochial school and apparently is doing better. The nurse who made the home visit commented that there was a considerable improvement. Formerly the mother seemed extremely unhappy and depressed. Both the mother and the home looked more cheerful, brighter and lighter. There was no information on the father.

Clyde's birth was normal. He weighed 7 pounds, 10 ounces; his color was good, and he breathed easily. There were no abnormalities during his stay in the hospital. He sat up at 7 or 8 months, crawled normally, and walked at 15 months. He babbled normally and started to talk at 11 months; however, his speech was unclear. In infancy Clyde had projectile vomiting. The family thought he would have to have surgery (Pyloric Stenosis). However, under medication the condition gradually improved and no surgery was necessary. Bowel training began at 20 months and was completed at 2 years. There was no regression in this. Clyde had measles and German measles when he was 4 years old, mumps at 5, and also serious gastritis with diarrhea and severe dehydration at age 5. He had a fever of 104 to 105 and was taken to the hospital for this condition. He went back to the hospital during that same year for a tonsillectomy and adenoidectomy. The ENT specialist told the parents that Clyde's ademoids were enlarged and were affecting his hearing. A bilateral myringotomy was also performed with the T and A. Clyde was not troubled with gastritis during the next year and no longer needed tranquilizing medication. School vision and hearing tests were satisfactory. There was apparently no residual physical difficulty from the early hearing problem.

III. School History

Clyde entered first grade at the Hillcrest school in September, 1965. He was 5 years, 10 months at that time and had not previously attended kindergarten. He was considered a "non-reader" by the first grade teacher, as well as a behavior problem, and was retained in first grade. His teacher said that he probably knew ten sight words and the beginning consonants. He was working in the pre-primer and could recognize some words, but not all of them. His reading ability was more like that of a child who had not gone through first grade. In the classroom Clyde was an extremely distractible child and seemed unable to control his hyperactivity. He tried to race through his work in order to finish first and then usually had to re-do it. He did not follow directions and needed to be told repeatedly what to do. He appeared to be quite aware of his problems and would frequently say to the teacher "I'm sorry I'm bad". The teacher felt that Clyde tended to do more careful work after he had been criticized than after he had been praised. In the latter instance he would simply race through his work again but would do it in a slovenly manner. He appeared able to express himself orally, but had a difficult time controlling his speaking out. He got along well with other children on the playground, but was overly aggressive in the classroom. Also he appeared less coordinated than his classmates although they were a year younger than he was. For example, he could not skip or maintain his balance on tip-toe.

When Clyde was in the second grade, he spent almost the entire morning in the resource room with a group of second graders.

During Clyde's third grade year, he spent one hour per day in the resource room during the time his class had reading.

The resource room was not located in the elementary school near Clyde's house (base school), so it was necessary for him to take a bus. He was a very disruptive force in the classroom in his base school. However, when placed in a small group situation in the resource room, he began to develop some inner control. He would follow directions and complete his work, however, he had to be reminded of specific classroom behavior, i.e. raising one's hand, not talking out of turn.

The following year he was placed with a strong classroom teacher and came to the psychoeducational diagnostician for reading only. The parents were contacted by the school social worker to explore the family situation and continued contact with Clyde's family physician was recommended.

IV. Pre-remediation Diagnosis

WECHSLER INTELLIGENCE SCALE FOR CHILDREN 10-20-66

| | |
|---|---|
| Verbal Scale IQ | 99 |
| Performance Scale IQ | 107 |
| Full Scale IQ | 103 |

| Verbal Tests | Scaled Score |
|---|---|
| Information | 7 |
| Comprehension | 10 |
| Arithmetic | 10 |
| Similarities | 13 |
| Vocabulary | 8 |
| Digit Span | 11 |

| Performance Tests | Scaled Score |
|---|---|
| Picture Completion | 9 |
| Picture Arrangement | 13 |
| Block Design | 12 |
| Object Assembly | 9 |
| Coding | 12 |

On the basis of this test, Clyde appears to be functioning within the average range of intelligence. He shows a somewhat better ability to manipulate concrete objects meaningfully than to deal in abstract concepts. Nevertheless, he displayed a good ability to conceptualize. His lowest score was in his general body of knowledge. One could wonder whether he had much academic stimulation from his parents. He did not know how many pennies in a nickel, how many days in a week, or how many things make a dozen. This suggested that he had trouble in number concepts. He said that Robinson Crusoe discovered America, which was rather surprising in view of the fact that the class had just finished hearing a story about Columbus. Another area which was below average, was his vocabulary. Clyde was not able to verbalize definitions of words satisfactorily for his age.

In the performance area, there was much wasted motion in the form of random movement of puzzle pieces. He would frequently szy, "This is hard", or "I am tired". He showed a great deal of discouragement while working on the puzzles and did not recognize correct juxtoposition even when he had accidently put them together. It was interesting to note that he put the face puzzle together upside-down. In the process of turning it right-side up and realigning some of the pieces, he ran out of time and did not receive full credit for this; however, he was still in the normal range for his age in this sub-test. In coding he worked quickly and well, mostly from memory and made only two mistakes. This showed satisfactory visual-motor coordination.

WIDE RANGE ACHIEVEMENT TEST 10-20-66

| | |
|---|---|
| Reading Grade Equivalent | 1.4 |
| Spelling Grade Equivalent | 1.6 |
| Arithmetic Grade Equivalent | 1.6 |

From this test, it can be seen that Clyde was functioning at first grade level in all three areas. His achievement showed that he had benefited somewhat from his year in school but certainly less than would be expected on the basis of his normal IQ. Clyde could recognize all the capital letters as well

as a few sight words; to, see, cat, red, and book. He did not display any word attack skills whatsoever. In spelling, he was able to write correctly the following: cat, in, go and (as well as his name). His writing was legible, but he fluctuated between capital letters and small letters. It appeared that Clyde was well placed in the first grade and was working with a group of children who worked at his own level.

BENDER VISUAL-MOTOR GESTALT TEST 10-18-66

On the Bender, the essential Gestalts for all 9 designs were quite good for Clyde's age. It is interesting to note that he did better on some difficult items than on the easier ones. Although he had many collisions and appeared quite disorganized in his approach, he showed no perseveration or anxiety, but simply carelessness and untidiness which were probably due more to immaturity than to any organic impairment. The quality of the Bender designs tended to support the average IQ found in the WISC.

ILLINOIS TEST OF PSYCHOLINGUISTIC ABILITIES 10-12-66

| Sub-test | Language Age |
|---|---|
| Decoding-auditory | 4-7 |
| Visual | 7-3 |
| Association-auditory vocal | 6-10 |
| vocal motor | 7-2 |
| Encoding-vocal | 6-7 |
| motor | 8-8 |
| Auditory vocal automatic | 7-7 |
| Auditory vocal sequencing | 7-0 |
| Visual Motor sequencing | 6-9 |

FROSTIG TEST OF VISUAL PERCEPTION 10-12-66

| Sub-test | Age Equivalent |
|---|---|
| Eye-Motor | 6-0 |
| Figure Ground | 6-0 |
| Form Constancy | 7-6 |
| Position in Space | 7-0 |
| Spatial Relationships | 7-6 |
| Perceptual quotient: | 96 |

BERRY-BUKTENICA DEVELOPMENTAL FORM SEQUENCE 10-24-66

Age Equivalent: 6-0

WEPMAN AUDITORY DISCRIMINATION TEST 9-12-66

5 errors in 40 words

The ITPA scores indicate retardation in auditory decoding and a slight retardation in vocal encoding. All other areas are at, or above, the chronological age expectancy. Clyde is unable to adequately comprehend what he hears and to express himself orally. The Frostig Test did not show a severe problem in visual perception. The Wepman showed some difficulty in discriminating words which were different. The Berry-Buktenica showed only a slight lag in his developmental age.

The above results did much to explain the basis of a major complaint by the classroom teacher that Clyde needed directions repeated many times before he could begin his work.

Clyde is a boy of average intelligence who was somewhat better able to manipulate concrete objects than to deal in abstract concepts. It appeared that his lack of academic achievement was primarily due to a learning disability, specifically in the area of auditory decoding, rather than to any lack of intellectual ability or to a serious emotional problem. Clyde displayed some signs of inadequate personality development, which appeared to arise from a lack of emotional and academic stimulation from his home. He was restless and frequently hyperactive. He did not immediately understand vocal instructions from the teacher. Both of these characteristics interferred with his classroom behavior. He tired easily and usually could not work for more than one hour without his performance deteriorating. Both the classroom teacher and the diagnostician stressed the fact that Clyde had "good days and bad days", during which he displayed great variability in his work. Clyde's visual-motor skills appeared to be somewhat immature, but not organically impaired. He worked better through his visual channel than through the auditory channel. He appeared to want to do well and to relate pleasantly with his teachers and classmates; however, his hyperactivity frequently caused problems in his peer relationship.

V. Remediation

Remediation was in the following deficient areas:

Auditory discrimination
Auditory decoding
Vocal encoding

The three areas were taught simultaneously, but emphasis was placed on the auditory channel.

Remediation procedures are discussed below.

A. Auditory Discrimination and Auditory Decoding

Clyde was retarded in this area by 2 years, 4 months. The following exercises were presented to Clyde to strengthen and develop his ability to discriminate and sort auditory stimuli. The remediation was begun at a very low level.

1. Discrimination of sounds of several manipulative objects which included a rubber frog, a whistle, a clicker, bells, and two sandpaper blocks, was introduced first. At the beginning Clyde was allowed to manipulate each object to build up a visual association with the sound of the object. The sounds of each were discussed and he was asked to try to describe them as louder, softer, and the types of sounds they make.

2. After Clyde was able to predict the sound each would make, he then was asked to tell which object made a particular sound without seeing it. Ex. Clyde sat with his back to the teacher and one of the objects would be used and he would have to tell which object had been used. Clyde caught onto this quickly and was able to do this easily after the first two weeks.

3. Records were then used which emphasized sounds on the farm, in the city, and around the house. He was able to do this without a great deal of reteaching.

4. After his success in identifying familiar sounds, at this time a multisensory approach namely visual, auditory, and touch was used. The consonant sound of d was then introduced. He listened to it, said it, and wrote it.

5. The vowel sound of short a was then put with the d and he blended da together and then d-a-d was blended for the word dad. Clyde seemed quite ready for sound blending and the rhyming of words.

6. Continental Press Language Development Level I worksheets were then introduced to help teach consonant sounds. These exercise sheets consisted of a given picture with a particular beginning consonant sound. He then had to identify all other pictures which began with the same sound.

7. Each week he had an assignment to bring in pictures from magazines that began with the sounds we had been working on.

8. At this point the tape recorder was introduced and the sounds of each consonant were recorded and he then had to write the letter symbol of each sound he heard. The reverse of this was also done. He was given the written symbol and asked to give the sound of that particular letter. This was then recorded and he listened again to the recording in an effort to detect any errors.

9. Again using the tape recorder, inappropriate sounds were introduced with a variety of letters and he was to identify the incorrect and give the correct. Clyde responded quite well to this activity.

10. After the sounds of the consonants were established, the Hegge, Kirk and Kirk drills were used. This began with using different three letter words with the same vowel sound. Ex. sat, cap, Pam, rag, can, sad, mat, sap, map, tap, etc.

Drill 1 - used the vowel sound a with combination of consonant sounds.
Drill 2 - used the o as in hot, hog, pod, mop.
Drill 3 - review of a and o sounds with consonants.
Drill 4 - short i - tin, pin, bit.
Drill 5 - review of a, o, and i.
Drill 6 - sound of short u - nut, fun, cut, bug, tub.
Drill 7 - review of a, i, o, u.

11. After establishing the vowel sounds with consonant sounds and blending these sounds into words, the SRA Linguistic Reading Program was introduced. This linguistic approach presented families of rhyming words without visual cues in the reading book. These families of words were then used in short stories. Clyde immediately liked the rhyming words.

Ex.

| | | |
|---|---|---|
| pan | ran | Nan |
| tan | can | man |
| van | Dan | fan |

The man ran to Dan.
Dan can fan Nan.
Can Nan fan Dan?

However, words such as to, the, and is, were taught separately and needed a great deal of teaching, testing and reteaching. A workbook with visual cues was used along with the reader which gave the child an opportunity to develop a concrete concept of the word. Clyde did quite well with this reading program.

12. After learning to read the words, Clyde was asked to spell them from sound and began to organize his own written sentences from the words presented each week.

13. Along with teaching Clyde to read and write from sounding, exercises in following oral directions were presented. Starting with a simple command to more complex.

Ex. a. Shut the door.
b. Pick up your pencil.
c. Shut the door and then sit down.
d. Open the door, and put your pencil on the chair.
e. Shut the door, pick up your pencil, put the pencil on the chalkboard, etc.

Clyde was able to perform a command of four directions without getting confused.

14. Another type of activity for use was playing the game of "Simon Says". This game consists of listening to someone give commands but the participants are only to do those acts which are preceded by the phrase "Simon Says". If it does not, then the child does not do the asked command.

15. Nursury Rhymes were used to develop Clyde's listening ability.

In the beginning visual cues were used (See-Quees puzzles) along with the auditory stimuli, and Clyde then had to repeat the nursury rhyme and explain what it was about.

16. Usually five minutes of each session for the past two months had been spent in asking questions which require a yes or no response.

Ex. a. Are you a girl?
b. Are you young?
c. Is it hot outside?
d. Are you larger than your father?

And then questions requiring yes, no, or maybe responses.
Maybe question: Ex. Can Jack ride a cow?

17. Exercises in listening:

a. Give a sentence and ask a question about it.
Ex. Sally and Dick went to the store to buy candy.
1. Who went?
2. Where did they go?
3. Why did they go?

Then give a paragraph and ask questions about it.

18. Another type of activity Clyde enjoyed was to read a story to him or tell him a story and then have him re-tell it in his own words. In the beginning this had to be supported by asking cue questions.

19. Using nonsense sentences was successful with Clyde. This was done by giving a sentence which did not make sense and having him tell what was wrong with it.

Ex. 1. Jimmy put on his clothes and went swimming.
2. Billy got up and put his shoes on and then his socks.

20. Prepositions were introduced and given in directions or sentences.

Ex.

| | |
|---|---|
| in | out |
| near | far |
| by | next to |
| on | off |
| top | bottom |
| over | under |

Then he was asked to use these prepositions to describe the position of objects. These exercises were on-going and had been a part of the lessons for the previous four weeks.

B. Vocal Encoding

Since there was a difference between his motor encoding and vocal encoding area of 2 years, 1 month, the latter required more development. This was taught simultaneously with the exercises used for developing the auditory decoding. An essential part of developing the auditory decoding is being able to monitor that which he himself is saying as well as what others are saying.

1. Letter sounds were first used.

2. Nursury rhymes were used. The Judy See-Quees puzzles of nursury rhymes were used regularly.

3. Re-telling stories he read or that were read to him. These progressed from a very simple story to more lengthy ones. He had difficulty organizing his thoughts.

4. Reading stories and poems in unison helped him remember them better.

5. Reporting things that had happened since the last session.

6. Expanding sentences was another type of exercise used. These progressed from simple to complex.

Ex. a. I saw a dog.
b. I saw a big dog.
c. I saw a big brown dog.
d. I saw a big brown dog run.

7. Finishing stories was something he had a great difficulty doing. From a picture, a beginning of a story was given and he had to finish it. This had been tried off and on for the previous two months and he was still unable to do this. This could have been due to his lack of self-confidence and he is afraid of not being able to succeed.

8. Constantly Clyde was reminded to use complete sentences when speaking.

9. The Rolling Words by Scott Foresman was successful with Clyde. He would make a word by combining consonants and syllables.

Ex. Some blocks would have only letters on them.
f,s,t,p,c,m,b, etc.
Some would have combinations of letters - at, an, it, ad, etc.
Then he would have to put these together to make words.
f + at = fat  s + at = sat  c + at = cat

10. Scott Foresman's Rolling Sentences were a little too difficult for him. These were blocks with words on them and he had to put them together to make sentences.

11. Since the Rolling Sentence exercises appealed to him, we made cards with simpler words on them and we played a card game with them. Three cards were dealt to each, the first to make a sentence won. This also started from the simple sentence to the more complex. These types of exercises were used to help him organize a sentence from the simple to the complex.

Ex. a. A picture of a dog running.
Response: The dog runs.
b. A picture of a dog running.
A picture of a rolling ball.
Response: The dog runs after the ball.

In addition to these specific remedial exercises some days were spent in helping Clyde gain control of himself. As was mentioned before, Clyde is very hyperactive and at times has no internal control over himself. He usually knew when he had a bad day in school and would say he had been in trouble. Time was given on these particular days to help him calm down and discuss how he could help himself. For example, it would help if his teacher put his desk against the wall to help prevent him from moving it all over the room. Also he agreed that it would help if the teacher could remind him

to put his hands in his lap and feet on the floor by giving him certain cues such as; putting her hand on his shoulder, or holding up two fingers.

Clyde seemed to be gaining better internal controls and his learning processes were better. However some days Clyde could not function in the classroom at all and was still quite a behavior problem at times.

During the year when Clyde was in the second grade, he spent almost the entire morning in the resource room with a group of second graders. The program consisted of a structured language program, a systematic, structured reading program and an arithmetic program which followed the second grade text. The sessions were always scheduled during the reading period and the resource room teacher gave the reading grade, the language grade and the arithmetic grade.

During the year when Clyde was in the third grade, he spend one hour a day in the resource room during the time his class had reading. The program was basically a continuation of the reading program of the previous year, with additional work in language arts and an emphasis on the use of comprehension skills.

Clyde had a very difficult time learning to read because he felt his failure keenly. His awareness of mistakes made him nervous and less willing to try. Consequently, the teacher was forced to implement a variety of gimmicks in addition to outlining a specific sequence of skills. In the beginning, the reading material had to be written on chart paper since he became very flustered at the sight of a book. It was also necessary, at times, to leave the room and allow Clyde to read into a walkie-talkie. Gradually, the stories were copied into a notebook, day by day, then week by week. It wasn't until the following spring, that Clyde was able to read in a book with the rest of the group.

The sequence of reading material follows:

1. Consonant sounds
2. Short vowel sounds (in this order)
   - a - as in cat
   - i - as in big
   - u - as in cut
   - e - as in bet
   - o - as in Bob
3. Consonant blends and digraphs
4. Suffixes -er, -es, -en, -est, -ness, -ing
5. Long vowel and vowel combinations (in this order)
   - ee - as in feet
   - ea - as in meat
   - oo - as in moon
   - ai - as in tail
   - ay - as in play

It took a complete year to teach steps one and two.

This reading program revolved around the Hegge, Kirk and Kirk Remedial Reading Drills, Let's Read series and the SRA Basic Reading Series. These were chosen because:

1. the vocabulary followed a coding system in which a letter had only one sound, and
2. because the words initially had only three letters. (Clyde could not remember more than four symbols in a sequence but could remember 5 to 6 sounds.)

Clyde was a very verbal child but he did have slight articulation problems. He was seen by the speech therapist regularly and was dismissed in the spring. He also received oral language practice in the resource room. The language program was based on work by Carl Bereiter and Siegfried Engelmann with culturally disadvantaged children and involved oral work with singular and plural forms of nouns, opposites, categories, prepositions, and simple problem solving.

When Clyde was in the third grade, an effort was made to utilize the reading skills and language skills which had been developed. He was encouraged to write original sentences, read stories, and write the answers to questions, and to develop summaries. Research projects were devised which utilized Childcraft materials and other selected materials from the library.

VI. Results of Remediation

Table 42 summarizes the results of remediation over the period from October 1966 to May 1968.

Achievement data, as measured by the Wide Range Achievement Tests is as follows:

| | 10-10-66 CA:7-0 | 5-27-69 CA:9-7 |
|---|---|---|
| Reading grade equivalent | 1.4 | 2.5 |
| Spelling grade equivalent | 1.6 | 2.5 |
| Arithmetic grade equivalent | 1.6 | 3.0 |

Clyde has no current problems with communication skills as demonstrated by most of the scores on the ITPA. Although he appears to have dropped in the ability to remember a sequence of symbols (as evidenced by the score on Visual-Motor sequencing), he appears to be less attentive to the task and more anxious about his performance than he has in the past.

On the WRAT Clyde demonstrated general functioning between the second and third grade elvels. He is often very anxious when asked to perform academically and makes mistakes that are usually due to carelessness, not a lack of knowledge.

Clyde

Table 42

| | Pretest 10-12-66 7-0 | Post Test I 5-10-67 7-7 | Post Test 2 5-55-68 8-7 |
|---|---|---|---|
| WISC IQ: Verbal IQ-99; Performance Scale IQ-107 | Full Scale IQ-103 | | |
| ITPA | | | |
| Auditory Decoding | 4-7 | AN 8-10 | AN 8-10 |
| Visual Decoding | 7-3 | AN 8-9 | AN 8-9 |
| Auditory-Vocal Association | 6-10 | AN 9-0 | AN 9-0 |
| Visual-Motor Association | 7-2 | AN 9-3 | 8-11 |
| Vocal Encoding | 6-7 | AN 8-11 | AN 8-8 |
| Motor Encoding | 8-8 | AN 8-8 | 8-4 |
| Auditory-Vocal Automatic | 7-7 | 8-9 | AN 8-6 |
| Auditory-Vocal Sequencing | 7-0 | AN 8-6 | AN 9-0 |
| Visual-Motor Sequencing | 6-9 | AN 9-0 | AN 9-4 |
| Total Language Age | 6-8 | 9-4+ | |
| Psycholinguistic Quotient | | | 108+ |
| VMI - Berry-Buktenica | 6-0 | | 7-10 |
| Frostig | | | |
| Eye-Motor Coordination | 6-0 | | 7-3 |
| Figure Ground | 6-0 | | 8-3 |
| Form Constancy | 7-6 | | 9-0 |
| Position in Space | 7-0 | | 7-0 |
| Spatial Relations | 7-6 | | 7-6 |
| Perceptual Quotient | 96 | | |

Clyde is functioning in his regular grade placement with remediation for reading. His teacher states that Clyde knows the general routine now and gets his work done. He can be controlled behaviorally in his school environment. He will look at a book and read without constant urging from his teacher. He relates reasonably well with the others in his group until competition becomes too keen.

These case studies serve to illustrate not only the variability of instruments required for an adequate assessment, but the variability between children and within each child. It also follows that the methods and materials reflected this variance.

It is readily apparent from these cases that the crux of a sound program of remediation involves a precise match between the severity of the disability and the intensity of the service, as well as a match between the cognitive style of the learner and the cognitive demands of the task.

CHAPTER VIII

Remediation

This discussion of remediation will focus on some general principles of remediation and specific competencies which have been evolved from the experiences of the psychoeducational diagnosticians in their work with a wide range of learning disabled children. Areas of competence in the teacher are stressed rather than areas of deficit in children, or a prescriptive approach, since it is ineffectual to be prescriptive except in relation to a specific child. The suggested eight areas of competence seem to provide an adequate base for designing a program for meeting the unique learning needs of a typical public school population of learning disabled children.

The tendency of some teachers to think of materials as the total program rather than as a supplement to good teaching, has resulted in the elimination of a materials list from this chapter. Emphasis, therefore, will be placed on general principles which can be adapted to appropriate materials, whether teacher-made or commercial.

General Principles of Remediation

1. Although the target population to be subsumed under the label of learning disabilities needs to be more narrowly defined for research purposes, it must be broadened for service purposes in the public schools. It has been found to be counter-productive to attempt to serve only those children who meet the very stringent criteria of learning disabilities in the resource-itinerant or consultant program. Thus, a viable public school program for learning disabled children would serve a broad range of handicapped children, from mild to severe, as well as some children with learning problems stemming from other causes. The intensity of the service would necessarily match the severity of the disability, with miminally involved chilren being served by consultant help to the classroom teacher.

2. The stringency of the application of eligibility criteria needs to be dependent upon the specificity of the treatment plan. If a child is to be placed in a self-contained class in a regional center, for example, the eligibility criteria would need to be carefully spelled out and stringently applied, so that children who are not handicapped would not be so labelled. If, however, the treatment program involves in-service training for the teacher, eligibility of children for service can be more loosely applied, since the possibility of stigmatizing the child unnecessarily would not be involved.

3. In order to design a clinical teaching program which can meet the varied learning styles present in this heterogeneous group of disabled learners, it is imperative that teachers develop competencies in at least eight areas:

a. Sensory-motor processing
b. Visual processing
c. Auditory processing
d. Language Development
e. Intersensory integration
f. Social adjustment
g. Emotional adjustment
h. Academics

4. The more closely the task is related to the long range goals for each child, the more effective will the program of remediation be. If the goal is to teach the child to read words, train him on letters and words not on squares and triangles.

5. Wherever specific deficits in process are apparent, it is necessary to begin slightly below that level and remediate the specific deficit. However, the strengths of the child must be utilized in the remedial program in order to provide a success base. If the deficit occurs in the auditory channel, strengths in the visual channel should be utilized until the auditory channel becomes adequately functional and these visual clues can gradually be phased out.

6. In the regular classroom it is necessary for the teacher to be aware of and utilize the child's strengths, minimizing as much as possible any emphasis on his deficits. Awareness of deficit areas however will aid the teacher in individualizing and adapting classroom assignments and expectations.

7. Positive feedback and frequent reinforcement of new learning are the elements critical to the student's progress. In addition, each student needs to understand his disability, be kept informed of his progress, and to be considered a person of worth.

8. Although specialized materials have become available in large quantities, it is not necessary to depend solely on these. Within any good basal reading series it is possible to find tasks which can be adapted and incorporated meaningfully into the remedial program, on the child's instructional level. In this way, the time spent in the regular class, using the materials of the general curriculum, and the time spent in specific remediation can be mutually reinforcing.

9. Although it may be necessary to work with some children on an individual basis, many remedial programs are more effective with used with small groups of children with similar needs. A needs assessment leading to the formation of small teachable groups will extend the value of the remedial service and incorporate peer-interaction, variety of feedback, and an element of competition.

10. It is very difficult to predict which children will respond to the remediation and which ones will not if only test data is used. Specific clinical teaching probes appear to be more reliably predictive of future progress than test data.

11. Clinical observation of the child in the learning situation will yield valuable diagnostic data to be incorporated into remedial planning, i.e., learning rate and mode, optimium group size, interests, attitudes, and dimensions of the disability i.e., (symbolic vs. automatic, decoding vs. encoding, etc.).

12. On-going evaluation which verifies or rejects the diagnostic hypothesis provides evidence of program effectiveness and a communication vehicle for teachers and parents. Learning activities should be continually modified to keep pace with new learning and new experiences. Diagnosis at best is temporary and ephemeral.

13. Management techniques, like academic tasks, need to be adjusted to the tolerance level and the behavioral level of the child and his needs.

14. Since every child needs to perceive himself as one who can, rather than one who cannot, at least as much emphasis needs to be placed on what he can do, as is placed on what he cannot do.

15. Adequate physical space and instructional materials are important for the maximum functioning of the program.

From this base of general principles it is possible to build a basic repertoire of teacher competencies necessary for working with a broad range of learning styles and patterns.

## Specific Areas of Competancy in the Teacher

The suggested eight areas of competence in which a teacher must have knowledge, experience and methods are illustrated in Figure 12:

1. Sensory-motor processing
2. Visual processing
3. Auditory processing
4. Language development
5. Intersensory integration
6. Social adjustment
7. Emotional development
8. Academics

Each of these areas will be defined, the disability characteristics delineated, and research commented upon briefly. A discussion of methods in each of these areas will follow.

## Sensory-Motor Processing

Sensory-motor processing refers to the operations whereby information is received, interpreted, stored, and integrated through the sense modalities and motor mechanisms and expressed motorically. Figure 13 illustrates some of the multiple components subsumed under the category of sensory-motor processing. The three broad categories which can be delineated for educational purposes are body orientation or body awareness, movement and haptic processing. Closely related to body awareness are the concepts of body schema or body image, laterality, directionality, orientation, synchrony, spatial relations, and temporal relations. The broad area of movement includes coordination, rhythm, agility, flexibility, strength, speed, balance, endurance (Frostig, 1970) and diadochokinesis. Haptic processing is associated with stereognosis, proprioception and localization of tactile stimuli.

INFORMATION PROCESSING MODEL

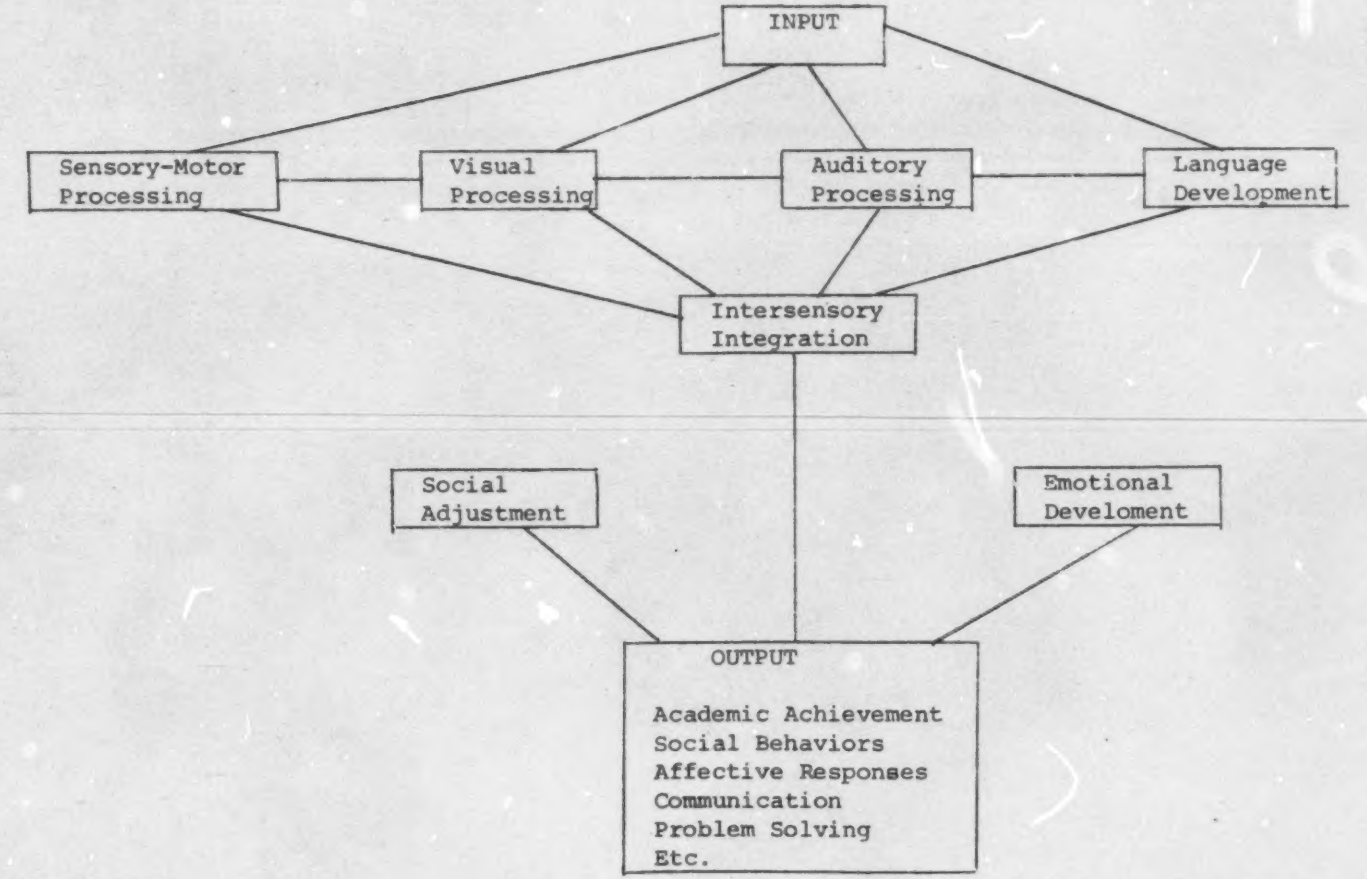



Figure 12

Children with disabilities in sensory-motor processing may display some of the following characteristic behaviors:

1. Inability to cross the midline of the body with the hand
2. Difficulty in left-right orientation
3. Inability to see himself in relation to his environment
4. Difficulty responding motorically to verbal commands
5. "Backwards" writing, starting at wrong side of page
6. Immature drawing of self
7. Poor map skills
8. Inadequate sense of time
9. Difficulty in starting and stopping
10. Poor coordination of large and/or small muscles
11. "Marches to a different tune"
12. Rigid movements
13. Muscular weakness of tension or slowness of movements
14. Poor sense of balance
15. Inability to make rapidly alternating movements, as in repeating polysyllablic words, the pa-ta-ka test, etc.
16. Inability to identify objects using the sense of touch

A careful review of a large body of research (Chalfant and Scheffelin, 1969) indicates that little definitive data exists about:

1. Haptic processing disorders and their assessment;
2. The effect of training on increased control over voluntary movement;
3. The restoration of control over voluntary movement;
4. Whether perceptual-motor training leads to improvement in perceptual motor abilities or to better academic performance.

The proponents of various motor training programs have produced some evidence which suggests that sensory-motor training may be effective with certain types of disabilities under certain conditions. However, conflicting results would suggest that caution and common sense need to be used until further data becomes available. Extensive reviews by Robbins and Glass (1966) and by Goodman and Hammill (1972) will provide further information to the educator who is concerned about the efficacy of teaching methods in this area.

For those children who exhibit behaviors suggestive of problems in sensory-motor processing, the following methods may be relevant:

1. Adaption of the physical education program to the interests, capacities and limitations of the student;
2. Object recognition by touch using a "mystery bag," and tactile recognition of letters and numberals;
3. Large muscle activities such as directed calisthenics, ballet, trampoline, swimming, bicycle riding, etc.;
4. Small muscle activities such as tracing, cutting, writing, arts and crafts activities, etc.

## SENSORY-MOTOR PROCESSES/FUNCTIONS

| | | |
|---|---|---|
| BODY ORIENTATION/AWARENESS | MOVEMENT | HAPTIC PROCESSING |
| BODY SCHEMA/IMAGE | COORDINATION | STEREOGNOSIS |
| LATERALITY | RHYTHM | PROPRIOCEPTION |
| DIRECTIONALITY | AGILITY | LOCALIZATION OF TACTILE STIMULI |
| ORIENTATION | FLEXIBILITY | |
| SYNCHRONY | STRENGTH | |
| SPATIAL RELATIONS | SPEED | |
| TEMPORAL RELATIONS | BALANCE | |
| | ENDURANCE | |
| | DIADOCHOKINESIS | |

Figure 13

Although none of these activities are unusual in themselves, they may fit into a clinical teaching program especially for children with developmental delays in motor functioning. A boy who has not developed the coordination necessary to ride a bicycle at 6 may need to be taught how at a much later age when readiness has developed. Activities need to be adapted to the abilities, needs, interests, and limitations of each student.

The area of sensory-motor processing affords an excellent opportunity for a team effort involving the classroom teacher, the physical education teacher, and the psychoeducational diagnostician who can identify the specific processes which need remediation. When incorporated into the total educational plan for a child with demonstrated disabilities, and with carefully thought out goals and objectives, sensory-motor training may constitute a legitimate part of the school curriculum. In addition, children need physical activity for release of pent-up energy, and frequently get a great deal of pleasure out of the activities involved in motor training. The question of the relationship of motor training to academic achievement is a serious one. However, programs of motor activities may serve quite different purposes.

Visual Processing

Visual processing involves the reception and translation of visual stimuli into meaningful concepts which can be retained to form new relationships which can be expressed graphically, motorically or orally. (Adequate visual acuity is assumed.)

Figure 14 delineates some of the functions included in the broad category of visual processing. Some of these functions are primarily perceptual, some conceptual, and some involve the integration of the visual stimuli with the motor output system. Among the perceptual functions are: attention, discrimination, figure-ground, closure, perceptual speed, constancy, recognitions, and some forms of memory. Among the conceptual functions are: abstraction, analysis, integration, synthesis, transduction and perhaps long-term memory.

Among those functions requiring integration of the visual systems with the motor systems are: eye-hand coordination, visual-motor memory, and other forms of visual-motor coordination.

Children with central visual processing dysfunctions may experience difficulty in:

1. Perceiving the details of an object;
2. Identifying the significant visual cues;
3. Obtaining meaning from what is seen;
4. Combining visual stimuli into groups;
5. Classifying or categorizing visual stimuli;
6. Abstracting concepts from visual stimuli;

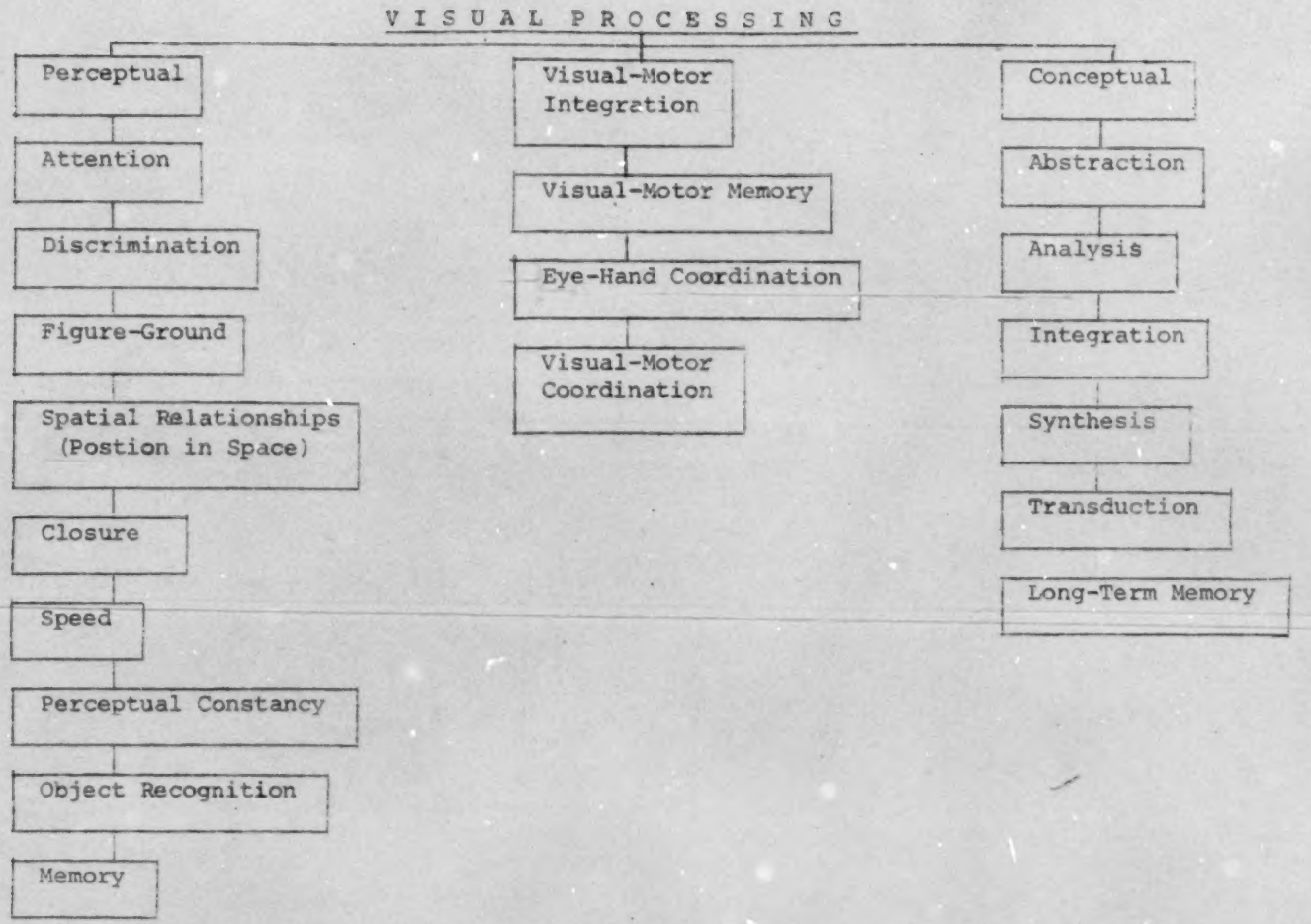

VISUAL PROCESSING
Perceptual
Attention
Discrimination
Figure-Ground
Spatial Relationships (Postion in Space)
Closure
Speed
Perceptual Constancy
Object Recognition
Memory
Visual-Motor Integration
Visual-Motor Memory
Eye-Hand Coordination
Visual-Motor Coordination
Conceptual
Abstraction
Analysis
Integration
Synthesis
Transduction
Long-Term Memory

Figure 14

7. Comparing the visual hypothesis with the actual object;
8. Remembering visual stimuli;
9. Attending to visual stimuli;
10. Holding the image constant, with resultant reversals or rotations.

The review of the research (Chalfant and Scheffelin, 1969) indicates that there is little or no evidence available about:

1. The significance of eye movements;
2. The relationship between motor development and visual processing;
3. The value of "vision training" in ameliorating eye-muscle disorders or improving the processing of visual stimuli;
4. Whether visual processing dysfunctions can be remediated, or whether it is necessary to provide compensatory mechanisms;
5. Changing one trait (visual percpetion) by training another (balance).

Research does indicate that:

1. Children's reading ability increases more from additional reading time than from perceptual training on the Frostig remedial program;
2. Speed of perception is directly related to the ability to discriminate visually.

For those children who exhibit behaviors suggestive of problems in visual processing, the following methods may be relevant:

1. Reading: since the reading process has been shown to be most effective in training visual processes;
2. Pointing to differences in visual stimuli;
3. Pointing to likenesses in visual stimuli;
4. Sorting visual stimuli by categories;
5. Object recognition;
6. Picture recognition;
7. Developing reference points for direction, distance, and, amplitude of movement;
8. Tracing;
9. Picture completion;
10. Copying a visual patterm with beads, blocks, pegs, etc;
11. Recall and construction of phrases and sentences;
12. Flash cards;
13. Puzzles
14. Flannel board activities;
15. Television;
16. Filmstrips;
17. Overhead projector, transparencies;
18. Tachistoscopic devices;
19. Films

Since most basal reading programs incorporate many of these teaching techniques, it has been found useful to mark all visual activities in the

teacher's manual in one color ink, and all auditory activities in another, so that children can be given practice in their areas of deficit.

Awareness of some of the factors involved in visual processing can provide a teacher with tools to do a task analysis when a student is unable to complete a visual task. More definitive research is needed in this area to determine the trainability of visual processing skills as related to the academic processes of reading and mathematics. The extent to which maturation is a significant factor in visual processing needs to be more clearly delineated.

Auditory Processing

Auditory processing involves the reception, selection, and translation of auditory stimuli into meaningful concepts which can be retained to form new relationships which can be expressed. (Adequate auditory acuity is assumed.)

Figure 15 illustrates the multiple components subsumed under the category of auditory processing. The two broad categories which can be delineated for educational purposes are perceptual and conceptual processes. The following are related to perceptual processing: attention, awareness, localization or focus, screening or figure-ground, recognition, discrimination, closure, sequencing, synthesis or sound blending, analysis, scanning and memory or signal retention. The broad area of conceptualization includes abstraction, integration, transduction, inference, monitoring, judgement or problem solving, and memory. Due to the significant role of language in educational achievement, expressive language, a function of auditory processing, will be viewed and discussed as an extension of this process.

Children with disabilities in auditory-vocal processing may display some of the following characteristics:

1. Inability to attend to auditory stimuli.
2. Inability to select pertient sounds and screen out extraneous stimuli.
3. Inability to recognize common environmental sounds (i.e. telephone ring, dog's bark, etc.)
4. Inability to discriminate sounds and/or words (b/d, p/g, now/how, etc.)
5. Inability to complete a cultural pattern orally (i.e. Here is a doll; Here are two _____).
6. Inability to properly sequence sounds, syllables or words.
7. Inability to interpret sounds, words, and sentences.
8. Inability to transfer concrete learning to abstract concepts.
9. Inability to form new relationships (creative thinking).
10. Inability to solve problems and make judgements.
11. Inability to recall details, labels, concepts, etc.
12. Inability to transfer sounds into written symbols.
13. Inability to translate verbal commands into motor actions.

## AUDITORY PROCESSING

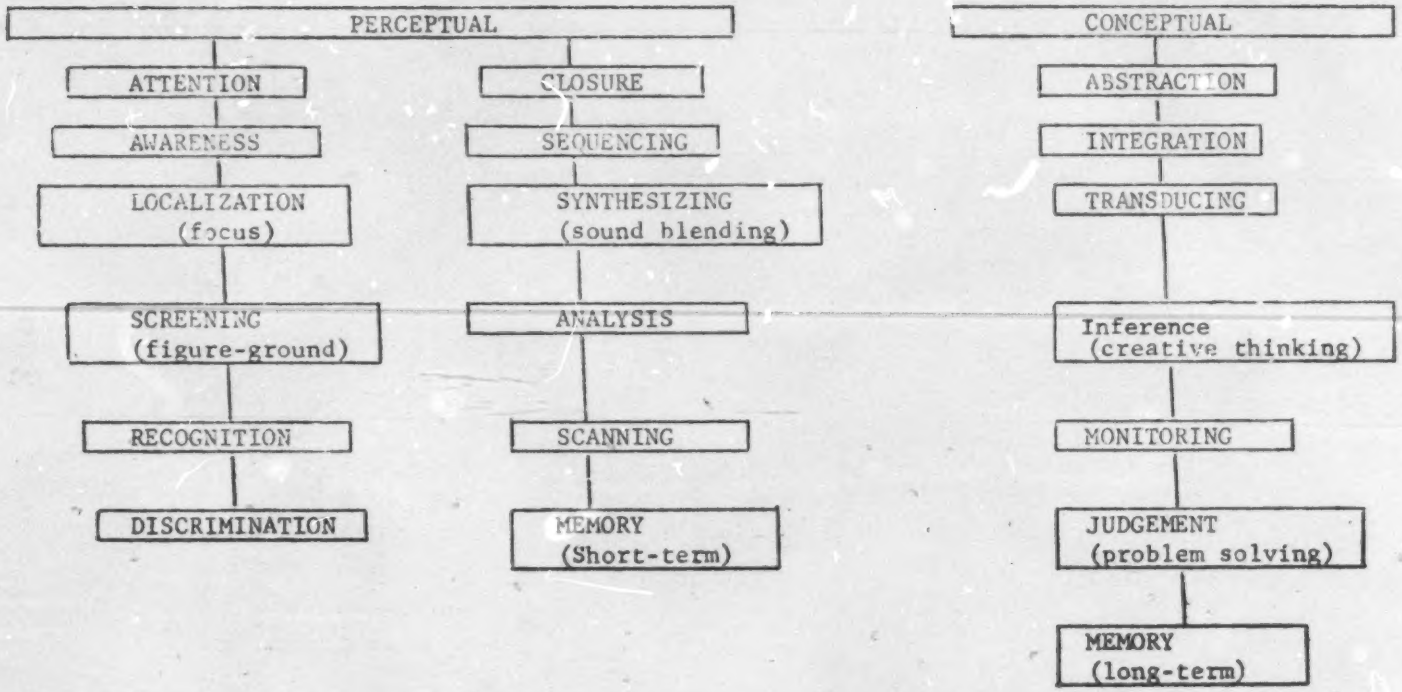



Figure 15

-160-

14. Inability to rhyme words.
15. Inability to identify the source of sounds.
16. Inability to reproduce pitch, rhythm, or melody.
17. Inadequate syntax. (Incomplete sentences, errors in word order, etc.)

A review of the literature indicates that little definitive data exists about:

1. The most efficient ways to teach children to attend to auditory stimuli;
2. The assessment or training of sound localization;
3. Methods or materials for teaching children to screen out extraneous auditory stimuli;
4. The training of auditory perceptual and conceptual disorders.
5. The precise relationship between auditory discrimination and phonics.

There is some research evidence available to indicate that:

1. Behavior modification, including selective reinforcement, can be used to increase attentiveness to auditory stimuli;
2. Among first grade children, non-readers make more errors on auditory discrimination tasks than adequate readers;
3. Development of auditory discrimination should begin with gross differences in sounds and proceed to finer differences;
4. Stimuli should be intensified and repeated.

For those children who exhibit behaviors suggestive of problems in auditory-vocal processing, the following methods may be relevant:

1. Provide meaningful experiences with language stimulation.
2. Provide listening activities.
3. Activities which include answering questions, labelling sounds, finding the main idea, interpreting ideas, describing relationships, recalling events and sequences, and proving hypotheses.
4. Respond to a series of verbal commands.
5. Provide verbal descriptions to promote imagery after concrete experiences.
6. Classification and generalization activities.
7. Provide reading experiences which involve language experience, sound-discrimination, sound-symbol relationships, sound-blending, recall of sight words, sequence, oral expression, comprehension, integration and inference.

The auditory channel provides significant input for information processing. Although further research is needed in this area, its important relationship to language and academics is evident. Attending to a task and developing listening skills form an important base for further learning.

Language Development

Language development involves a sequence of abilities to receive and understand information and/or ideas and communicate them in a meaningul, symbolic way in a written, spoken, manual or gestural form.

Language provides a means for naming or labelling objects and actions, distinguishing between their properties, and describing their interrelationships. Figure 16 illustrates the multiple components involved in language. These have been organized under four primary classifications: phonology, or sounds, morphology, or forms, syntax or structure, and semantics or meanings. The discrete elements in each category have been sequenced from the simple to the complex, i.e. babbling represents the most simple task in sound production, with fluency the more complex and developing at a later age.

Children with problems in language development vary widely, but may have some of the following symptoms:

1. A difficulty in retrieving words, or in reauditorization;
2. Problems in sequencing elements in a series;
3. Disturbances in narrative speech;
4. Slow, telegraphic speech;
5. Problems in initiating expressive language;
6. Semantic disorders;
7. Faulty articulation;
8. Syntax and morphology disorders.

An exhaustive review of the literature in the area of language development leads to conflicting results. Little is known about:

1. How much vocal-motor behavior and receptive language is necessary for adequate expressive functioning;
2. The role of the central nervous system in the development of language, although it is generally agreed to be extreme;
3. The trainability of auditory memory;
4. Sound localization as it relates to learning.

Research has produced evidence that:

1. Speech centers of the brain are in the left hemisphere in the vast majority of individuals, even in left-handed children;
2. Many signs of brain damage such as "abstracting problems" and some so-called "perceptual difficulties: seem to disappear once stable patterns of attention are established;
3. Failure to discriminate differences in rhythm patterns, pitch, and melody may interfere with the discrimination of different sounds and sound patterns.
4. Both articulation and the analysis and synthesis of speech sounds are centered in the same area of the brain. This accounts for the

# LANGUAGE DEVELOPMENT

| PHONOLOGY (SOUNDS) | MORPHOLOGY (FORMS) | SYNTAX (STRUCTURE) | SEMANTICS (MEANING) |
|---|---|---|---|
| BABBLING | PLURALS | CONCATENATIONS (SEQUENCING) | DECODING (COMPREHENSION) (RECEPTIVE LANGUAGE) |
| ARTICULATION | POSSESSIVES | WORDS | ASSOCIATION (INNER LANGUAGE) |
| IMITATION | TENSES | SENTENCES | |
| PHONICS | COMPARATIVES | PHRASES | ENCODING (ORAL EXPRESSION) (GESTURAL LANGUAGE) |
| DISCRIMINATION | RHYMES | GRAMMAR | CLASSIFICATION |
| PITCH | HOMONYMS | | CONCEPT FORMATION |
| VOLUME | SYNONYMS | | JUDGEMENT REASONING |
| SOUND BLENDING | PREFIXES | | |
| CLOSURE | SUFFIXES | | |
| DIADOCHOKINESES | COMPOUND WORDS | | |
| FLUENCY | | | |

Figure 16

-163-





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frequency of language disorders which accompany articulation problems.

Some methods which might be used for children exhibiting expressive language problems might include:

1. Provide language stimulation;
2. Provide experiences for concept development;
3. Imitation of sounds, words, phrases, and sentences;
4. Teach discrimination skills;
5. Follow directions;
6. Tell events of stories in sequence;
7. Dictation exercises;
8. Provide concrete experiences;
9. Add language to experiences;
10. Use language and experience to generalize;
11. Translate generalization to symbols;
12. Express concepts verbally or in a written or manual form;
13. Exercises in written language (graphic representations, written words, signs, and symbols);
14. Reading;
15. Concept formation exercises.

Due to the close relationship between language development and academic achievement, an emphasis on language activities is indicated. It is the means for sharing information, for developing concepts, and for problem solving.

Intersensory Integration

Intersensory Integration is the process by which sensory information from different modalities is coordinated or transduced. Sensory information appears to be processed by individual channels in a specific way and then integrated by intersensory processing. Intersensory integrative processing refers to the central synthesis of multiple stimuli which are presented to different sensory modalities. Intrasensory integration refers to the central synthesis of multiple stimuli which are presented to the same sensory modality. Seeing and hearing are involved when a child reads orally. A child may be able to see well, to hear well, but have difficulty doing both simultaneously. Some children may need to shut their eyes as they process information auditorially. Determining subfactors of each channel is difficult because of intersensory transfer and the difficulty of isolating them, (particularly language subfactors). Task analysis techniques as described by (Chalfant and Scheffelin, 1969) represent a viable model for analyzing learning tasks and facilitating learning activities.

Learning involves an active transaction between an individual and some input. The input is meaningful when an individual performs certain operations or processes upon it. Processing can not be "given" to a student. Assistance in the development of processes would appear to be the teacher function. Precise teaching strategies need to be developed. Students need to be given opportunities for concrete operations before abstract operations and symbolic content are expected. Rate of achievement varies from student to student and is an important consideration in task determination.

A child who has difficulty with intersensory integration may have some of the following difficulties:

1. Easily distracted (unable to differentiate irrelevant visual or auditory stimuli).
2. Sound-symbol association problems;
3. Difficulty using more than one sense modality. (The child may shut his eyes when concentrating on a listening task.)
4. Unorganized directed movement or action.
5. Slow rate of processing information.

A review of the very limited research indicates that we know little or nothing about:

1. The number and nature of the inter-sensory integration systems;
2. The growth and development of sensory integrative systems;
3. The nature of integrative disorders or the etiological correlates of these disorders;
4. The impact of biochemical imbalances on integrative disorders;
5. The extent to which integrative disorders can be ameliorated;
6. The amount of training necessary to improve integrative functioning.

The limited body of research in this area demonstrates that we know:

1. That the function of one sensory system is affected or modified by the function of other systems;
2. That the integration of information from a single sense modality appears earlier than the capacity to integrate information arriving through more than one sense modality.
3. That children can perceive shapes accurately before they can reproduce them.
4. That visual-haptic judgement develops first, then haptic-kinesthetic, and visual-kinesthetic judgement, by about 11 years of age.
5. The most rapid improvement in integrative abilities occurs at about the same time the child goes to school (CA 5-7);
6. That auditory-visual integration may underlie intelligence;
7. That brain damage may be a factor in integrative disorders;
8. That children learn best if verbal material is presented first aurally and then visually;
9. That the individual characteristics of each child should determine the appropriateness of specific remedial procedures.

Strategies for facilitating intersensory integration might include:

1. Providing multi-sensory input.
2. Delineating the sensory modality for each lesson in the basal reader (i.e. red for auditory tasks, etc.)
3. Recording patterns of responses according to sense modality.
4. Beginning slightly below level in a weak or inadequate sensory area and slowly provide small sequential steps using cues from the adequate sensory area and/or areas.
5. Teaching sound-symbol relationships in reading.
6. Dictating exercises.
7. Following verbal directions and responding motorically or in a graphic mode.

Social Adjustment and Emotional Development

Appropriate emotional development and social adjustment are basic to learning. It has proven helpful for the teacher to separate social behavior from emotional development, since the teacher can elicit dramatic observable changes in behavior, but may find information about emotional development much more difficult to verify. The modification of social behavior in the classroom is at least as important to the role of the teacher as effecting change in the child's ability to count.

Social adjustment involves the ability to interpret situations appropriately and to respond in a socially and culturally accepted mode. Children who are socially maladjusted may exhibit some of the following behaviors:

1. Lack of awareness of acceptable norms of behavior
2. Social withdrawal (preference for solitary activities)
3. Frequent fighting
4. Disobedience
5. Uncooperativeness
6. Aloofness (social reserve)
7. Passivity
8. Distructiveness
9. Negativism
10. Impertinence
11. Profane language
12. Preference for much older or younger playmates
13. Excessive demands
14. Agressiveness
15. Inappropriate social behavior, i.e., masturbation, nose-picking, etc.

Emotional development refers to the sequence of behaviors which reflect a gradual transition from a primary concern with self i.e., ego-centricity, to a primary concern for others, reflected in a gradual development of control over primary emotional states. Behaviors

which reflect a balanced mature, healthy development of basic defense mechanisms are evidence of adequate emotional development.

Children with emotional disorders may exhibit some of the following characteristics:

1. Poor ego functions;
2. Not reality oriented;
3. Temper tantrums or outbursts, inappropriate for chronological age;
4. Lack of self-control;
5. Self-involvement to excess;
6. Inability to work for long-term goals;
7. Easily frustrated;
8. Hypersensitivity, or hyposensitivity;
9. Anxiety (chronic general fearfulness)
10. Excessive daydreaming;
11. Depression (chronic sadness)
12. Enuresis;
13. Psychosomatic disorders;
14. Specific fears;
15. Irresponsible and/or inattentive behaviors.

A review of selected research studies indicates:

1. A positive correlation between social maturity and mental development.
2. Children with behavioral disorders generally cluster into three groups:
   conduct disorders
   personality problems
   inadequate and immature behaviors
3. Etiology may be related to psychological factors, psychosocial factors, and/or organic factors.
4. A large percentage of children in classes for emotionally disturbed are retarded educationally.
5. Conservative estimates of the prevalence of children with behavioral disorders in the school population ranges from 2-22%.
6. Little is known regarding the relationship of emotional disturbance to academic achievement.
7. Little is known of the incidence of emotional disturbance among children from different societal groups.

Methods which might be effective for children with social and/or emotional problems might include:

1. Consistent and routine procedures;
2. Personalized instruction;
3. Encouragement of feedback from the child;

4. Lack of interruptions;
5. Kindliness and concern for individual needs;
6. Specific class standards and limits;
7. Reinforcement of positive behaviors;
8. Ignoring negative behaviors;
9. Frequent opportunities to succeed and gain positive recognition;
10. Supportive teacher role;
11. Self-evaluations by the child;
12. Providing chances for decision making.
13. Keeping distractions to a minimum;
14. Providing meaningful, purposeful activities;
15. Making instructions very clear;
16. Listening and observing the child frequently;
17. Accepting the student as a person of worth whose behavior is indicative of a child who is in need of learning and exceptional teaching.

Approaching a child with social and emotional problems from a phenomenological perspective often gives insight to the teacher. If she/he would "walk in the child's shoes", then perhaps the teacher would be in a better position to understand and thereby relate with the student.

Determining behavioral objectives in the affective domain as well as the cognitive and psychomotor areas would be particularly helpful for the student with social and emotional problems. According to Bloom and Krathwohl, 1964, the affective domain deals with values, attitudes and interests. The "arousal value" of interests and readiness of a student needs to be considered in order for a student to see himself as "one who counts and one who can" before he can reach out to others to form meaningful relationships.

Academics

Academic achievement traditionally involves a student's functioning in the scholastic areas of a curriculum which include vocabulary, reading, work-study skills, English mechanics, mathematics, and general understandings in science and social studies.

Students who have academic disabilities may exhibit some of the following characteristics:

1. Inadequate language skills.
2. Inability to associate sounds with symbols.
3. Inadequate sound blending.
4. Very limited sight vocabulary.
5. Inability to follow directions adequately.
6. Lack of left-to-right orientation in reading.

7. Poor comprehension of reading material.
8. Inability to compare and contrast words, pictures, etc.
9. Additions, substitutions and omissions when reading orally.
10. Reversals in reading or writing.
11. Spelling difficulties.
12. Poor writing skills.
13. Poor oral and/or silent reading.
14. Lacks one-to-one correspondence when counting objects.
15. Inability to regroup in math.
16. Inadequate place value concepts.
17. Inaccurate computation in math.
18. Poor math reasoning.
19. Inability to demonstrate abstract math concepts with concrete objects.
20. Inability to make change.
21. Lack of punctuation in writing.

Reading

Figure 1 delineates the skill areas involved in the reading process. Research in reading, writing and spelling has been abundant, conflicting and confusing. Much of the research falls into the category of redundant research. In spite of the conflicting results of thousands of studies in reading, evidence from a variety of sources seems to support the following conclusions:

1. The most important variable in any reading program is the teacher; comparisons of teaching methods frequently show no significant differences. The way the teacher teaches is more important than what she teaches.
2. Any method of reading that uses a decoding approach will be superior to a sight method or one which stresses comprehension over word-attack skills.
3. Reading disability cases have more deficiencies at the automatic-sequential level than at the meaningful level.
4. Retarded readers perform at a lower level on tests of visual memory than good readers.
5. Retarded readers do not perform as well on tests of auditory memory as good readers.
6. Visual closure and sound blending are less well developed in poor readers than in good readers.
7. A positive correlation exists between intelligence and reading, particularly in young children.
8. The acquisition of spoken language is closely related to the decoding of written language.

Although voluminous research efforts have been expended involving the process of reading, some of the important areas which are as yet unresolved include:

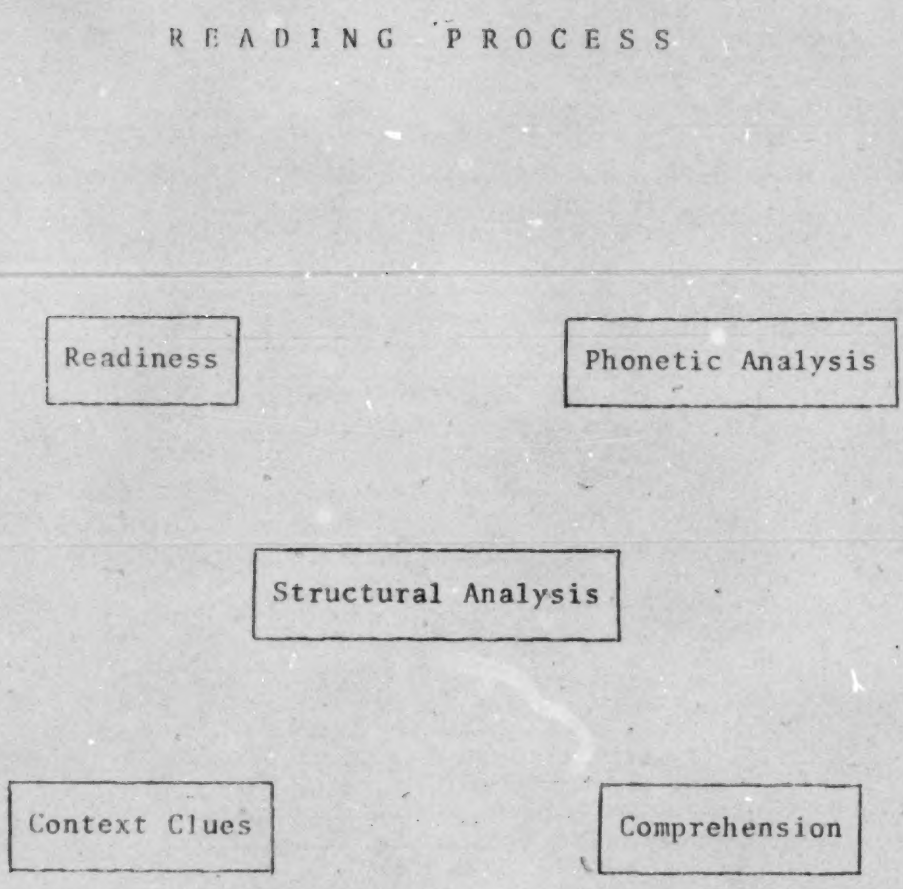
READING PROCESS
Readiness
Phonetic Analysis
Structural Analysis
Context Clues
Comprehension



Figure 17

READING SKILLS

- Readiness
  - A. Discrimination
    - Auditory
      - General Sounds -- M *
      - Specific Sounds -- H
      - Rhyming Elements --M
    - Visual
      - Pictures -- M
      - Shapes -- L
      - Letter forms -- H
      - Words -- H
  - B. Left to Right Progression -- H
  - C. Following Directions -- H

*Priority Key: High = H, Medium = M, Low = L

Figure 18

- Phonetic Analysis
  - A. Auditory-Visual Association
    - Letter Identification
      - Sound-sight concept -- H
      - Sight-sound concept -- H
    - Word Identification
      - Sound-sight concept -- H
      - Sight-sound concept -- H
  - B. Auditory Visual Application
    - Consonants
      - Initial -- H
      - Final -- H
      - Medial -- H
      - Digraphs -- H
      - Blends -- H
      - Variants -- H
      - Silent consonants -- H
    - Vowels
      - Short -- H
      - Vowel digraphs -- H
      - Long vowels (final e) -- H
      - Schwa-- H
      - Vowel dipthongs -- H
      - Vowels followed by r & l-- H



Figure 19
-172-

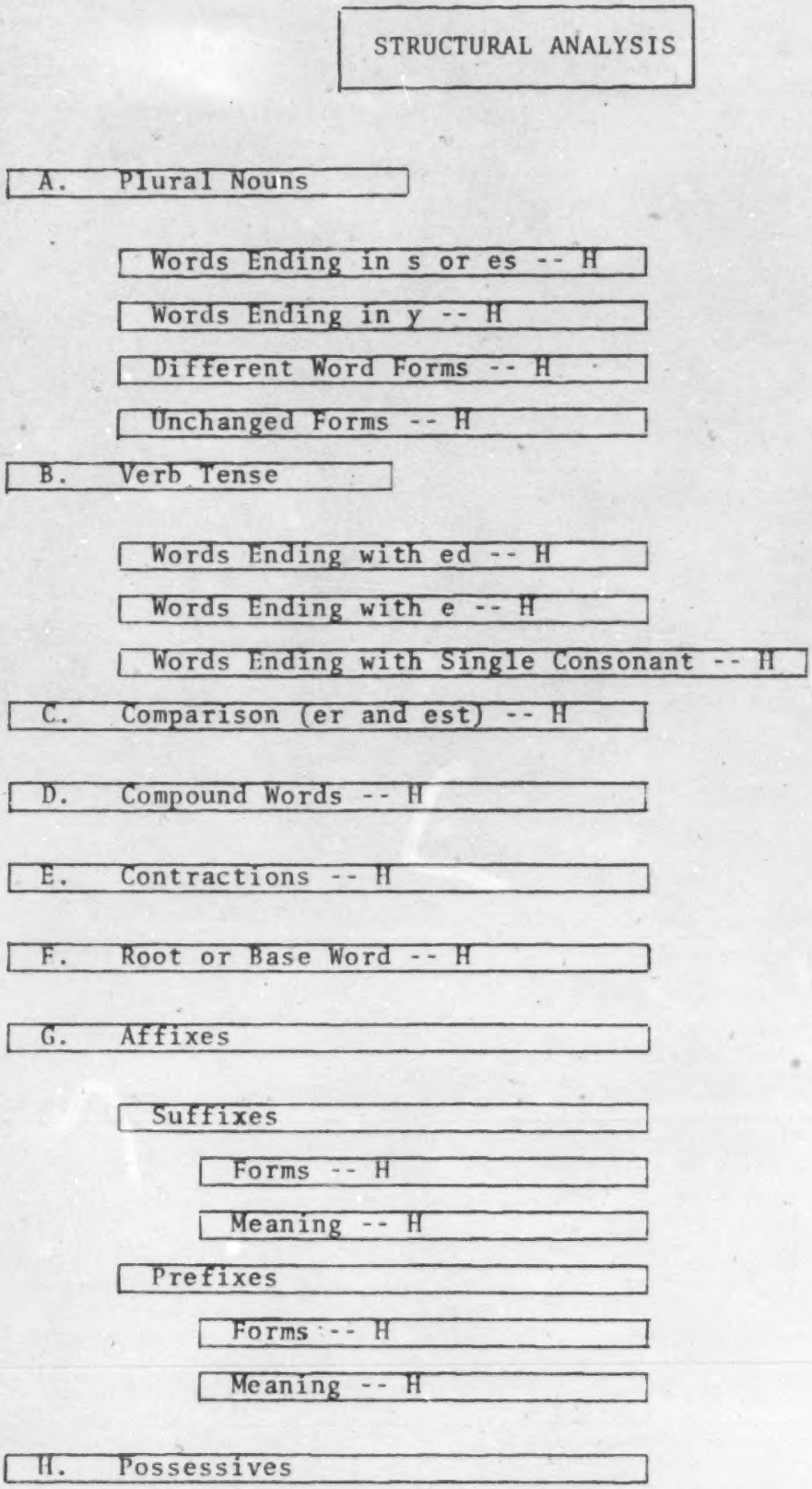
STRUCTURAL ANALYSIS
A. Plural Nouns
Words Ending in s or es -- H
Words Ending in y -- H
Different Word Forms -- H
Unchanged Forms -- H
B. Verb Tense
Words Ending with ed -- H
Words Ending with e -- H
Words Ending with Single Consonant -- H
C. Comparison (er and est) -- H
D. Compound Words -- H
E. Contractions -- H
F. Root or Base Word -- H
G. Affixes
Suffixes
Forms -- H
Meaning -- H
Prefixes
Forms -- H
Meaning -- H
H. Possessives

Figure 20

STRUCTURAL ANALYSIS
Continued

I. Syllabication

- Number of Syllables -- H
- Vowel Sound in each Syllable -- H
- Application
  - Macron -- H
  - Breve -- H
  - r-Controlled -- H
  - Words ending in el and le -- H
  - Between two vowels unless letters represent vowel digraph or dipthong -- H
  - Syllabication generalizations (vc/cv, V/ev) -- H

J. Accent

- Primary -- M
- Secondary -- L
- Unstressed Syllable -- L

K. Abbreviations

L. Special Type as Indicators -- L



Figure 20 (cont.)
-174-

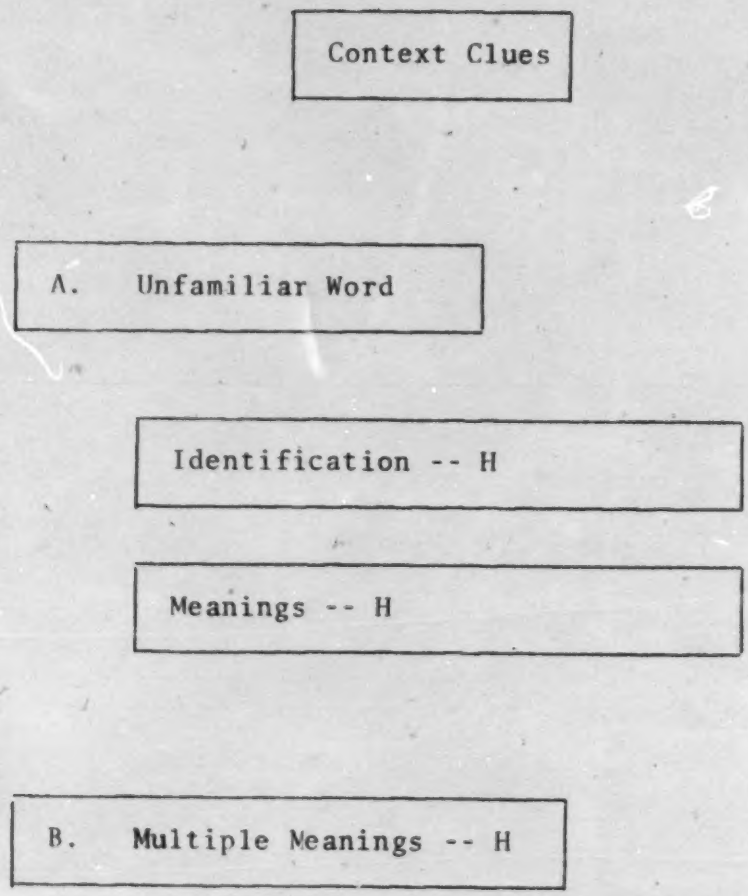




Figure 21
-175-

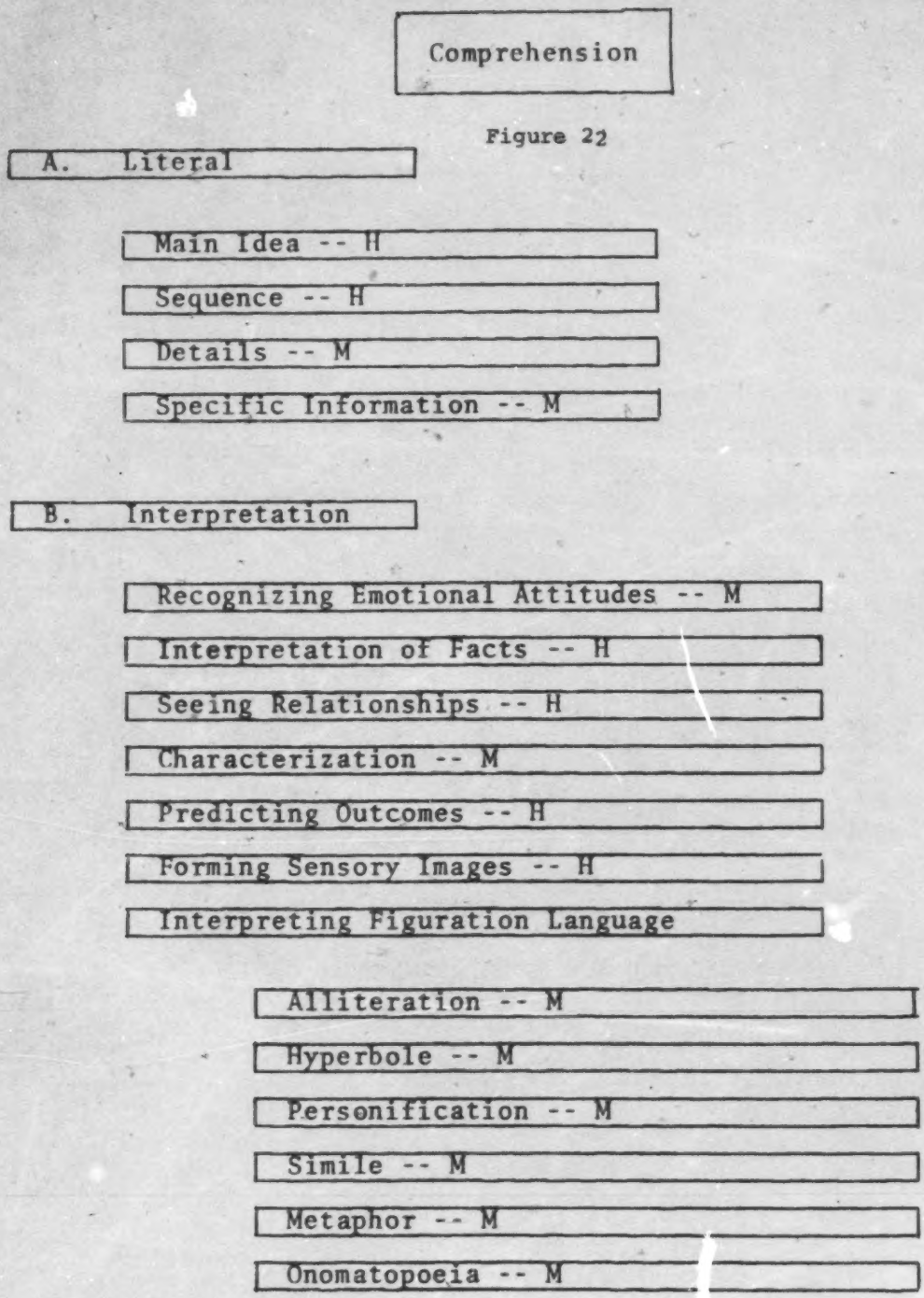
Comprehension
A. Literal
Main Idea -- H
Sequence -- H
Details -- M
Specific Information -- M
B. Interpretation
Recognizing Emotional Attitudes -- M
Interpretation of Facts -- H
Seeing Relationships -- H
Characterization -- M
Predicting Outcomes -- H
Forming Sensory Images -- H
Interpreting Figuration Language
Alliteration -- M
Hyperbole -- M
Personification -- M
Simile -- M
Metaphor -- M
Onomatopoeia -- M
C. Critical
Distinguishing Real and Fantasy -- H
Distinguishing Fact or Opinion -- H
Recognizing Author's Techniques -- L

Figure 22

Comprehension
Continued

Figure 22 (cont.)

- D. Work Skills
  - Utilization of Punctuation
  - Reading Rate
    - Fluency -- H
    - Skimming and scanning -- L
  - Alphabetizing
  - Use of References
    - Dictionary skills
      - Definitions -- L
      - Guide words -- L
      - Variant word meanings -- L
      - Diacritical markings -- L
    - Encyclopedia
      - Guide words -- L
      - Index -- L
      - Key Topics -- L
    - Library Skills
      - Check out -- L
      - Self-selection -- L

Comprehension
Continued

Figure 22 (cont.)

D. Work Skills

Use of References (continued)

Parts of Books

Table of Contents-- L

Glossary-- L

Index -- L

Newspapers

Index -- L

Major selections -- L

Telephone directory -- L

Tables and Schedules -- L

Pictoral and Graphic Materials

Maps -- L

Globes-- L

Charts -- L

Diagrams -- L

Graphs -- L

Models -- L

Outlines -- L

Comprehension
Continued

Figure 22 (cont.)

D. Work Skills

Organizing Information

Outlining -- L

Classifying -- L

Summarizing -- L

Bibliographies -- L

1. A thorough analysis of both beginning and advanced reading tasks;
2. The role of ocular factors (which have recently been refuted as major contributions to reading problems);
3. The role of hearing losses in reading failure;
4. The nature of perception and its significance for success in reading;
5. The question of whether of not there is a common visual perceptual factor or several factors;
6. The relation of laterality and cerebral dominance to reading factors.

Children with specific learning disabilities in the area of reading may range from mild to severe. It is customary to suggest than an educationally significant discrepancy between capacity and achievement may be an indication of the presence of a learning disability. The same may be said of a child with a remedial reading problem. The similarity in symptomatology between children with specific learning disabilities and remedial readers needs some clarification and warrents further study. There appears to be considerable overlap between the skills and function of the remedial reading teacher and the learning disability teacher. A well-trained remedial reading teacher may possess skills quite similar to those of a well-trained learning disabilities teacher for children whose learning disability falls primarily in the area of reading.

Arithmetic and Mathematics

Research has identified a number of factors which seem to be related to success in arithmetic and mathematical operations, but the extent to which these factors, either singly or in combination, contribute to the attainment of different kinds of quantitative concepts is still open to question.

Studies (Chalfant and Scheffelin, 1969) related to the basic cognitive processes involved in quantitative concepts indicate that at least four factors are involved:

1. Spatial ability;
2. Verbal ability;
3. Problem-solving ability;
4. Neurophysiological correlates.

Studies have also indicated that intelligence as measured by IQ tests is a major factor in arithmetic and mathematics. Measured IQ, especially certain verbal measures, has been a good predictor of academic achievement in the past. Most IQ tests are basically achievement tests and reflect a statistical redundancy which obviously may be highly correlated because both tests (achievement and IQ) are measuring many of the same abilities (achievement or school learning). Until an adequate measure of innate potential is developed, an information processing model with an

experimental emphasis is recommended as a remediation strategy. The model of the Illinois Test of Psycholinguistic Abilities (reception, association and expression, automatic and representational; auditory and visual, etc.) is helpful in the processing analysis.

Some techniques to facilitate academic achievement might include:

1. Delineation of specific instructional objectives in all skill areas as well as content areas;
2. Sequencing of skills into specific developmental sequences;
3. Using criterion - referenced tests to determine the specific task the child has not yet mastered in the sequence;
4. Development of specific skill packets keyed to the basal reading or math series being used in the class;
5. Individualization of instruction based on providing materials and exercises aimed at these pinpointed skills in the sequence.

Parts of this series of activities are being provided by many publishers. Some publishers include in the instructional packets only material contained in their own published material. Others provide helpful suggestions using a wide range of suggestions in several basal series. Several school districts as a part of their curriculum development activities, have found that development of skill sequences and learning packets by groups of local teachers is more meaningful than purchasing such programs from publishers. The process seems more meaningful than the product to some teachers.

The formal development of such techniques for individualization may provide the in-service training and the materials for a more practical, feasible approach to individualization of instruction. It can be hypothesized that such an approach would reduce dramatically the numbers of children referred to Special Education as "Learning Disabilities".

# CHAPTER IX

## Summary

As a part of an effort to fund programs for children with specific learning disabilities, prior to the passage of the Learning Disabilities Act, Part G of the Education for the Handicapped Act of 1970, the Bureau for the Education of the Handicapped granted funds to Schaumburg School District 54 for a research and demonstration program. The major objective of this project was to demonstrate methods whereby a small public school district could mobilize existing resources to implement sound programs for children with specific learning disabilities.

The setting for the study was in Schaumburg District 54, a small rapidly growing suburban school system northwest of Chicago, in Cook County, Illinois. At the initiation of the study there were 7500 children enrolled in ten elementary schools. At the completion of the study three years later, there were approximately 12,000 children enrolled in seventeen buildings. In addition to regular classroom teachers, each building was served on an itinerant, part-time basis, by a psychologist, social worker or counselor, speech clinician, school nurse, and psycho-educational diagnostician. Through the operation of classes for the educable mentally handicapped in District 54, or through participation in a Special Education Cooperative, the needs of those handicapped youngsters in need of special class placement were being met. The program for children with specific learning disabilities was developed to serve those children whose educational needs could not be adequately met within this existing special education structure.

### Overview of the Study

The project included six components:

1. The administrative referral and selection system for learning disabled children;

2. A comparison of resource room and itinerant programs as alternative delivery systems;

3. A study of the psychological and psycholinguistic characteristics of sub-groups of children with specific learning disabilities;

4. A report of the progress of children in the Developmental First Grade program;

5. A study of the social behaviors of children with specific learning disabilities;

6. A report of methods of remediation developed during the study; and their application in three selected case studies.

The Administrative, Referral and Selection System for Learning Disabled Children

Children were systematically referred by their regular class teachers to the diagnostic remedial staff serving each school. Those itinerant specialists serving each school, plus the principal and any special education teachers in the building, were designated as the Child Study Team whose primary function was intake and the evaluation of progress of each child referred. Decisions were made on the management of each child referred by all persons involved.

During the first year of the pilot project the population of grades kindergarten through six was 4667 children. Of this, 218 children were referred for diagnostic evaluations, a referral rate of approximately 5%. During the second year, out of a population of 6400, 296 children were referred to the learning disabilities program, a referral rate of 4.7%. This referral rate of 5-6% per year has remained relatively constant; but is confounded by the limited services available, and a relatively unstable population base. Approximately 2.7% of the population was diagnosed by the Child Study Team as having specific learning disabilities. This figure may more accurately reflect the number of children who could be served with a limited staff rather than the total number of learning disabled children in the schools.

After careful screening for children who appeared to fit the National Advisory Committee Definition (1968), children were selected who met the following criteria:

1. A Two-year deficit between a subtest and average language age on the ITPA; or
2. A total of 108 months discrepancy between total language age and all subtests on the ITPA; or
3. A two-year discrepancy between M. A. grade expectancy and achievement; plus
4. A Reading Index (Monroe, 1932) below .80.

In addition to meeting these quantitative criteria, data concerning social, emotional, physical and experiential background were carefully evaluated in the Child Study Team Conference.

A Comparison of Resource Room and Itinerant Programs

The thirty children served in the learning disabilities resource room over a three year period were matched individually with thirty children in the itinerant program on six variables, WISC IQ, CA on entrance into the program, achievement, months in remediation, sex, and presence of organicity. The resource room program required that the children be bussed to another school for service; the itinerant program brought services to the child in his home school. By comparing these two groups of matched subjects, some comparison of these two methods of delivering services were made. The results indicated that:

1. On the ITPA, the itinerant group gained on the average 16.8 months in language age in a period of 16.9 months. The resource group gained 7.0 months

in a period of 19.3 months. The difference in gains was statistically significant at the .05 level in favor of the itinerant program. In addition, there were no statistically significant differences in gain scores on a single subtest of the ITPA for the resource group whereas the itinerant group showed statistically significant differences on every subtest of the ITPA.

2. On the Frostig Test of Visual Perception similar results were obtained. The resource group showed 1.0 PQ (perceptual quotient) points gain over the period of training while the itinerant group showed 17.5 PQ points gain. This is obviously statistically significant. In addition, the resource group showed statistically significant gain scores on only one subtest (eye-motor coordination), while the itinerant group showed statistically significant gain scores on all tests but one (Spatial Relations).

3. On the Visual-Motor Integration Test both groups gained significantly, 19.2 months in 19.3 months for the resource room and 16.4 months in 16.9 months for the itinerant group.

4. Iowa Tests of Basic Skills data was available only on those children at the third grade level or above. On this smaller sub-sample of children, pretreatment differences between groups were not significant, although the resource room scores were consistently higher. Mean gains for both groups were statistically significant, ranging from 1.0 years to 1.9 years. However, the mean gain of 1.4 years in 2.1 years is not educationally encouraging. Although receiving remediation, both groups continued to lag behind normal achievement gains.

It will be noted from the above data that the itinerant group showed a superiority on the ITPA scores and on the Frostig Tests of Visual Perception, and equal gains on the Visual Motor Integration Test and on the Iowa Tests of Basic Skills. In terms of the numbers of children served, the gains in basic psycholinguistic processes and school achievement, plus the expense, time and inconvenience, it would appear that the itinerant program could be more feasible in districts of comparable size and proximity of schools.

The Psychological and Psycholinguistic Characteristics of Sub-Groups of Children with Specific Learning Disabilities

The heterogeneity of the population subsumed under the category of specific learning disabilities has made it a difficult group to define or to ascribe a set of characteristics, and to establish eligibility criteria. The conflicting results of research may be due to the diverse groups studied, rather than to the procedures or methodology used.

In order to explore the problems of more homogeneous clusters or subgroups, the following questions were asked:

1. Are there clusters of disabilities which accurately characterize subgroups within the total population of children placed in the learning disability program?

2. What are the psychoeducational dimensions of these subgroups?

The following conclusions seem appropriate:

1. Veldman's adaptation of Ward's Hierarchical Grouping technique appears to be a suitable statistical procedure for identifying subgroups. It is a clinical approach to the data which does not obscure the differences within the groups as happens with measures of central tendency.

2. Utilizing the quotient data, there appear to be two qualitatively different subgroups within the population, with quantitative differences describing three clusters within the second group. The first group is characterized by above average general intellectual and psycholinguistic functioning but relatively severe deficits in visual perception. The second group is characterized by below average intellectual and visual perceptual functioning with severe language deficits. This pattern appeared in three clusters at quantitatively different levels. Since perceptual functioning was at the same level as general intellectual functioning, the major problem in these three groups appeared to be in language.

3. Utilizing the subtest scores on the ITPA to further define subgroups on the psycholinguistic dimension, three clusters were identified. The largest subgroup appeared to be made up of slow learners with association process deficits. The second was made up of bright subjects with sequencing deficits at the automatic-sequential or perceptual level. The third group was characterized by below average psycholinguistic scores with extreme discrepancies among the subtests and severe deficits in the auditory channel.

If this study can be replicated with similar findings, it may be possible to gather empirical data upon which to build a research base which would help to resolve some of the questions which are now perplexing the field. It might then be possible to make statements about which remedial methods work with which subgroup, rather than finding that gains are obscured by the statistical approach to the data as is the case at the present time.

The Developmental First Grade

The focus on children with specific learning disabilities during the research and demonstration project in Schaumburg resulted in the development of services for the early identification and prevention of learning disabilities, the Developmental First Grade program. A detailed study was made of the cognitive, perceptual and psycholinguistic development of 59 high-risk children placed in four modified first grade classes.

Three questions were raised which resulted in the following conclusions:

1. Kindergarten teachers appear to be able to effectively screen and identify children who are not ready for the academic demands of first grade with a minimum of help from specialists. A five-step screening procedure has been developed, utilized, and revised over a period of eight years.

2. Patterns of cognitive, psycholinguistic, and perceptual development in these children cannot be elicited reliably with the use of such parametric techniques as means, standard deviations, correlations, etc., because of the absence of a normal distribution of variables. Any procedures of statistical analysis which obscure the variations between individuals and permit the extremes to be diluted into group tendencies are inappropriate for this heterogeneous group of children.

However, the patterns of cognitive and psycholinguistic development based on the mean performance of this heterogeneous group suggest the following tentative conclusions:

a. On the WPPSI, the group scored significantly lower on arithmetic and block design than on other subtests. Relative cognitive strengths appear on those subtests concerned with vocabulary, comprehension, picture completion, mazes and geometric designs. Relative deficits appear to be on those subtests concerned with information, arithmetic, similarities, animal house and block design.

b. On the ITPA, the mean language ages for all subtests and total language age scores of the group were below C.A. for the group. Relative strengths were noted in the decoding process, both auditory and visual, Disabilities were apparent in the encoding process and in auditory sequencing.

c. Visual perception, as measured by the five subtests of the Frostig Test appeared to be more than a year below chronological age, with a perceptual quotient of 84. All five areas were uniformly low. Similar findings on the Visual Motor Integration Test were noted.

d. Auditory discrimination as measured by the Wepman Test appeared to be inadequate or invalid for 81% of the subjects.

e. These patterns of abilities and disabilities appear to be consistent across all measures. However, large variations within the group suggest that these children are a part of an extremely heterogeneous group.

3. In regard to the efficacy of a modified first grade program geared to the remediation of specific deficits, the following conclusions were drawn:

a. The ITPA profiles were not flat, either before or after treatment. The mean psycholinguistic quotient increased significantly, from 83.5 to 92.2, a statistically significant gain of 8.7 points. Total language age increased 13.3 months in 8 months, significant at the .01 level. All subtests except Auditory Sequencing increased significantly with mean gains ranging from 10 months to 20.9 months. It can be concluded that the children in the Developmental First Grade show an accelerated rate as well as a significant increase in the level of psycholinguistic development.

b. Significant gains were noted in the Visual Perceptual Quotients on the Frostig with a mean gain of 9.5 points. Significant gains on all subtests were noted ranging from 10 months to 22 months. The subjects improved substantially in their level as well as their rate of visual perceptual development.

c. The mean age gain on the Visual Motor Integration Test was significant, and the rate of development as measured by the VMI quotient was also increased significantly.

d. Auditory discrimination abilities as measured by the Wepman showed significant gains with 61% scoring adequate in the posttesting, as compared to 19% in the pre-testing.

e. The Developmental First Grade appears to provide a vehicle for effectively remediating the specific deficits and accelerating the rate of development found in children judged to be not ready to succeed with the demands of the first grade program.

Social Behaviors of Children with Specific Learning Disabilities

The purpose of this aspect of the project was to explore data concerning the behavior of a group of children who had been diagnosed and placed in the learning disabilities program, to compare their behavior patterns with those of emotionally disturbed and normal children, and to determine the effects of remediation programs on these social behaviors.

Data were collected for 36 children between the ages of 6 and 13, of normal intelligence, in grades one to seven, who had been placed in a remediation program involving regular class placement plus individual or small group treatment by itinerant learning disability teachers. Teachers' and mothers' ratings were obtained, using the Behavior Problem Checklist and the Q-Sort Behavior Analysis Test. The results indicate the following:

1. The factor analysis of the Q-Sort Behavior Analysis Test yielded four factors:

| | |
|---|---|
| Factor I | Conformity-Cooperativeness |
| Factor II | Conduct-Problem-Disruptive |
| Factor III | Sensitivity-Alertness |
| Factor IV | Immature-Hypotonic |

The Q-BAT appears to be useful as a means of collecting data about behavior in a quantifiable way. Clinically it seems to be a worthwhile device; statistically, it will require caution.

2. The factor analytic study of the behaviors of learning disabled children on the Behavior Problem Checklist yielded the same three factors found by Quay, Morse and Cutler (1966):

| | |
|---|---|
| Factor I | Unsocialized Aggression |
| Factor II | Immaturity |
| Factor III | Neuroticism |

This three dimensional framework provides a viable approach to the study of problem behaviors in groups of learning disabled children. It may be an additional criterion to be considered in the differential diagnosis between emotionally disturbed and learning disabled children.

3. The comparison of the behavior of learning disabled, emotionally disturbed, and normal children suggests that the behavior of emotionally disturbed children looks like the behavior of learning disabled children, only more so. The quantitative difference in ratings was significantly different between groups, but profile similarity between the factors is evident. Conduct-problem behavior appears to be the main characteristic of both emotionally disturbed and learning disabled children.

4. In examining the effect of remediation on the social behaviors of the children, it is apparent that teachers saw little improvement after a year of remediation. Ratings on the conduct-problem dimension increased as reported by teachers. Mothers reported some improvement in all areas except conduct-problem behavior.

This aspect of the study supports the view that learning disabled children are idiosyncratic unto themselves, behaviorally as well as cognitively.

The Program of Remediation

During the course of the study, the psychoeducational diagnosticians experimented with many methods and materials as they tried to find the most effective program of remediation for each child. Some general principles of remediation evolved from this experience with a broad range of learning disabled children. These fifteen general principles are stressed in the eighth chapter, since they can be adapted to appropriate materials for the many combinations of disorders in the psychological processes found in these children.

After several years of a trial-and-error approach to the learning disabled child, it became evident that the range of disabilities presented by the children needed to be matched by specific areas of competence in the teacher.

In order to design a clinical teaching program which could meet the varied learning styles present in this heterogeneous group of disabled learners, it was found that teachers needed to develop competencies in at least eight areas:

a. Sensory-motor processing;
b. Visual processing;
c. Auditory processing;
d. Language development;
e. Intersensory integration;
f. Social Adjustment;
g. Emotional development;
h. Academics;

Each of these areas of competence has been defined, the disability characteristics delineated, research commented upon briefly and a discussion of appropriate methods presented in each area of competence. The components of each area are delineated and sequenced in the form of charts. The specific functions incorporated into the reading and language paradigms

represent an important addition to the teachers knowledge of the total process as well as their inter-relations.

The application of these principles and methods is presented in Chapter VII in relation to three specific case studies, each presenting a different combination of disabilities. These particular case studies were chosen because they illustrate problems frequently encountered in the public schools, i.e., the relation between mental retardation and learning disabilities, the relation between auditory processing deficits and reading, and the relations between aphasia, hyperactivity and learning disabilities.

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